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## ORIGINAL COMMUNICATIONS.

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### THE NON-SURGICAL TREATMENT OF INFLAMMATION OF THE NASAL ACCESSORY SINUSES.

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About ten or twelve years ago extensive and radical surgical procedures were greatly in vogue for the cure of diseases of the nasal accessory sinuses, and rhinologists vied with one another in devising new methods for their complete obliteration on the principle that this was essential to recovery. The fact of serious facial disfigurement, which was the not infrequent consequence, was therefore entirely subordinated to this one object.

Unfortunately, however, although entailing many disadvantages to the patient, results as regards a permanent cure of the disease were frequently disappointing. Owing to certain structural and physiological peculiarities not sufficiently taken into account, the most radical operations were not necessarily the most successful ones, and it was found that the patients were often doomed to long, tedious, distressing terms of recovery, with sometimes more than one repetition of an extensive operative procedure.

Moreover, too little regard was had for the nose as an organ having important vital functions and the turbinals and other parts were sometimes ruthlessly sacrificed with serious after-effects.

None of these considerations, however, were so influential in bringing about a reaction from radical surgery of the sinuses as the fact that operators had the sad experience of witnessing every now and then the development of a meningitis with generally a fatal outcome.

We will observe, therefore, many authors who were formerly strong advocates of radical intervention, expressing at the present time very conservative views with regard to the treatment of the nasal sinuses, and recent literature shows that there is great confidence now in certain simple non-surgical methods—such as the use of suction or negative pressure.

The purpose of this paper will be chiefly to consider the rationale of the cure of sinus inflammation and to discuss the principles involved as well as the results obtained in some of the newer methods of treatment.

In order that we shall be able to establish rational principles for treatment of the disease of any organ, we need to fix our mind especially upon two points, one being the factors of its causation, the other the natural processes of repair. We must seek for the causes that we may remove them, and for the processes of nature that we may imitate them.

As peculiarities of development, of structure and of function are relevant to the subject, it may be pardonable for the purpose of a logical and symmetrical development of my thesis, to briefly review a few elementary details.

The nasal accessory sinuses are regarded by some authors as mere vestigial remains of organs which in the lower animals and in primitive man had important olfactory functions.

Originally they formed a part and parcel of the nasal cavities which communicated with them through wide openings. But as their usefulness as olfactory organs lessened, they became gradually walled off, leaving only small communicating apertures or channels, which we can readily understand must be maintained in order to provide ventilation and drainage of cavities still lined with functionally active mucous membranes. If the vestigial character of the sinuses be accepted, it follows that they must be regarded as organs of inferior vitality, a fact which may explain on the one hand their reputed vulnerability to disease, and on the other their incapacity for complete repair after extensive injury.

The mucous membrane of the sinuses differs from the mucous membrane of the nose in degree rather than in kind. The

glandular elements and nerve filaments are less numerous and the blood supply to the submucosa less abundant. Not only, however, is the layer of epithelial cells thinner, but especially to be noted is the fact that the genetic layer of the epithelial surface is less substantial, all facts pointing, it seems to me, quite significantly to a lessened power of regeneration on the part of the submucosa. Therefore, from histological as well as developmental considerations, arguments are to be drawn which speak strongly against extensive operative intervention and in favor of extreme conservatism in dealing with the nasal accessory sinuses.

A few words in regard to their anatomical peculiarities:

The nasal accessory sinuses give us little concern in early childhood and almost none at all during infancy. The maxillary sinus is present in but a very rudimentary form at birth; its permanent shape and normal position are not obtained until after the eruption of the permanent teeth. The frontal sinus is not present at all at birth; it makes its first appearance at about the second year and at about the eighth year assumes the form of a distinct cavity. The ethmoid and sphenoid sinuses are present at birth, but like the others, develop slowly and do not assume their complete form and size until puberty or even later.

The nasal accessory sinuses in the adult are very variable with regard to form, dimension and capacity and the situation of their apertures. In general, however, we find that they have a volumetric capacity equal to twice that of the nasal fossae proper, and, normally, each sinus will have at least one aperture of communication, through which the mucous membrane covering its wall becomes continuous with that lining the nasal passages. As pathological processes tend to spread by continuity throughout any homogeneous structure, it is nothing more than we could expect that inflammation affecting the nasal passages should involve the sinuses. The inference with regard to the indication to give attention to the condition of the nasal passages is sufficiently evident and we may lay aside the question as to whether or not the sinuses can become independently inflamed. Certainly in the great majority of cases the nose is primarily affected.

When the openings of the sinuses are in proximity, infection of one of these sinuses from the other is always imminent. Therefore, the frontal, anterior ethmoidal and the maxillary sinuses, which constitute the anterior group and open near each other in the region of the hiatus semi-lunaris, are frequently observed to be concomitantly diseased. Similarly, we find the posterior

ethmoidal cells very often involved in case of suppuration of the sphenoid sinus, or vice versa, because these two constituting the posterior group open near each other in the region of the superior meatus. Capillary attraction and syphonage are probably the active forces in causing a spread of the purulent infection.

In addition to the fact that certain of these sinuses are in such intimate anatomic relation through their cells, walls and ostia, another fact arguing for their mutual pathological dependence is to be found in their common vascular and vaso-motor supply. Causes which act through these media are likely to influence simultaneously, in greater or less degree, the entire nasal accessory system.

The obvious deduction to be drawn from these considerations is, of course, that treatment of any kind, restricted to a single sinus, may prove futile so long as a neighboring sinus continues to suppurate. Radical measures will therefore often have to be much more extensive than originally contemplated.

The maxillary sinus, in addition to those causes common to other sinuses, is in a certain proportion of cases affected by caries of the roots of certain teeth, which are in anatomical relation with its floor—most commonly the second bicuspid and first molar. The dental origin formerly regarded as responsible for about one-half of all antral suppuration seems to have lessened as a factor and according to later statistics can hardly be incriminated for more than one-third of all cases.

Of great interest in connection with the treatment as well as the genesis of sinus inflammation is the size, conformation, and especially the situation of their ostia.

Looking at a sagittal section exposing the lateral wall of the nose, we observe that the frontal sinus has its outlet at the most dependent place so that the secretions will fall downward through a narrow channel, opening either in the upper part of the hiatus semi-lunaris, or just anterior to it.

The opening of the maxillary sinus, which may be seen in the lower posterior end of this hiatus, instead of being at the most dependent locality is situated, on the contrary, near the roof, so that with the patient in the upright position no fluid can flow by force of gravity until the cavity is practically full.

The same is true also of the sphenoid, whose opening may be seen in the superior meatus on the upper part of the anterior sinus wall.

Much has been made of these various positions on the ostia relative to the sinus cavities. The deduction generally made with regard to treatment is that while a frontal sinus may be depended upon to get rid of a purulent collection because of the favorable situation of its outlet for drainage, the case is hopeless for the antrum and the sphenoid unless surgical measures are resorted to. To hold such a view means to have far too little confidence in the resources of Nature, who provided other means for the emptying of the sinuses than gravity alone.

Skillern has shown that if finely powdered lamp black is strewn over the mucous lining of the sinus of freshly slaughtered calves, the black particles may be observed to travel the space of 1 cm. per minute toward the ostium, no matter what the situation, and that in a short time it will have completely escaped into the nasal cavity. This is accomplished through the activity of the ciliated epithelium which is without doubt the most potent force in ridding the sinuses of contained secretion. The mucous membrane of all the nasal accessory sinuses is of the ciliated type. The fine hairs or cilia are in rapid and constant motion and always towards the sinus opening.

The waving of one of these cilia has been likened to the lashing of a whip. It is estimated to occur at the rate of about twelve times a second, the forward movement being twice as rapid as the return. Warmth and an alkaline reaction of the secretions favor their activity, whereas cold, too great acidity and irritant chemicals have a retarding effect. We see, therefore, in the action of these cilia a powerful force overcoming the laws of gravity. We see at the same time the necessity of their integrity being maintained and of the importance of securing a proper environment for their activity, from which facts we may not only draw general arguments in favor of conservatism, but also some practical deductions for local treatment.

It shows the advantage of bringing into contact with the membranes no medicaments which have not been warmed, and if in solution they must be alkaline and bland—never strongly irritant. When the secretions become thick, viscid and abundant, ciliated action is embarrassed and their removal is consequently a rational indication.

In the plan of the lymphatic distribution, unlike the case of the blood supply, there is no reason for the common involvement of the sinuses or the extension of disease from one to the other. The lymphatics forming an interlacing network over the

walls of the individual cavities seem to radiate in each case toward the ostium, where they communicate with the large vessels of the nasal fossae. They are no doubt a part of a protective mechanism and acting in conjunction with the ciliated cells tend to relieve the cavities of exudate and epithelial debris, which accumulate as a result of inflammation of its lining walls. The direction of the flow being toward the nasal cavities, inflammatory engorgement within the latter will naturally impede this wholesome draining process, produce stasis of the lymphatics of the sinus and thus favor bacterial invasion.

In addition to the action of the ciliated cells of the lymphatics certain physical forces, according to Yankauer, may be counted upon to promote the evacuation of the sinuses. These are especially capillary attraction and syphonage.

Through adhesiveness of the secretions of the sinus wall, assisted by ciliated action of the epithelium, an accumulation of fluid in one of the sinuses will never be perfectly level, but have always a high meniscus reaching as a rule to the ostium.

Then capillary attraction and syphonage come into play, the former favored by the conformation of the ostial edges, the latter by the continuity of the secretions within the cavity, with what has escaped into the nasal passages through the natural orifice of communication.

Now apertures of the sinuses are maintained evidently by nature for another function beside that of draining away the secretions. As we have already mentioned there was a period in physical development when the sinuses widely communicated with the nose and were constantly in contact with the inspired air. It is for this reason probably that air is still a necessity for their normal health and vitality.

Just as the tympanic cavity becomes congested and diseased when its normal supply of air is cut off by obstruction of the Eustachian tube, so the nasal sinuses suffer when the ostia become in any way occluded. The air in the enclosed cavity becomes gradually absorbed, and the resulting rarefaction tends to produce a sagging in of the yielding membranous lining attended with marked passive congestion. If in such a case a purulent secretion is already present in the cavity, saprophytic microorganisms multiply and bring about a decomposition of the stagnant secretions. It is quite likely that the severe pains experienced in some cases of sinusitis may be due to the pressure of gases arising from the decomposition of pus.

How many physiological facts seem therefore to point to the positive necessity of keeping these ostia clear, as one of the prime indications of sinus treatment?

The bacteriology of the sinus is a topic of great interest, closely related to the subject in hand, but unfortunately, though much has been written, very little has resulted of practical value.

The normal sinuses, contrary to our former opinions, have been shown by more recent investigations to be nearly, if not completely, sterile. Experiments seem to show that the mucoid secretions, if they do not possess actual bactericidal properties, at least are capable of inhibiting bacterial growth.

A great variety of micro-organisms is found in sinus suppuration and there is none which can be rightly called the specific cause. An inflammation which may have begun with a certain micro-organism predominating will often later on show an entirely different one taking its place, and it is the rule to find mixed cultures in a suppuration that has lasted any length of time. For these reasons, if for no other, vaccine treatment of sinus inflammation in the chronic form must be regarded as somewhat chimerical.

Pyogenic cocci seem more often responsible for sinus suppuration than bacilli. Those most frequently found are the pneumococci, streptococci, staphylococci and diplococci.

While many infectious diseases are complicated with sinusitis, in most instances they must be looked upon as only predisposing causes, preparing the soil, as it were, for local infection.

Exception must be made of four diseases in which apparently the sinus inflammation is directly and primarily due to the specific organism of the disease. These are influenza, croupous pneumonia, diphtheria and erysipelas. Of these by far the most frequent cause is influenza, whose importance as a cause of sinusitis was first pointed out by Lindenthal and later emphasized by Hajek.

Now, finally, let us see if some deductions can be drawn from what has been said that may aid us in the practical question of the treatment of the nasal sinuses.

Certainly on anatomical, physiological and biological grounds, we find considerations which weigh heavily against the undertaking of surgical procedures, which involve extensive injury to the parts. As J. Gordon Wilson in a recent article<sup>1</sup> says:



"To replace epithelium in a dependent cavity by scar tissue is to replace it with tissue with no physiological action. I cannot conceive of a healthy antrum existing after extensive curettage. The teaching of nature is obvious. The mucous membrane of the sinus is doing important work. We may aid by reducing chronic vascular and lymphatic engorgement; we may assist in the removal of excess secretions; but if we do so at the expense of permanent damage to the ciliated walls we may well go slowly and ask what compensation we offer for the loss."

After years of radical surgery the testimony of experience is now finally coming into line with these theoretical considerations.

No man in the past was a warmer advocate of radical sinus surgery and no one performed these radical operations with more skill than Dr. Lewis Coffin. Yet in the same number of *The Laryngoscope* in which appeared the article from which the above quotation is taken, we find also a paper by Coffin advocating non-surgical measures and describing a new apparatus which he has devised for medical treatment of the sinuses.

"My experience," he says, "has been that in many cases in which I have done most thorough and radical operations, there have been recurrences of the disease at variable lengths of time."

He makes the observation that a sinus which has been once diseased, though treated to the point of apparently entire recovery, is more likely to become again affected than a previously healthy sinus in the same individual.

A complete consideration of the non-surgical treatment of the nasal accessory sinuses would require us to discuss general as well as local treatment. Of the former we shall have little to say. In acute conditions one would make use of such remedies designed to combat the general infection and to relieve pain. For the more chronic conditions only general tonic and hygienic treatment would be considered.

For the acute attacks salicylates are in great vogue. Aspirin is especially of great value because of its anodyne effect. Diaphoresis repeated several nights successively is very helpful in the early stage. Urotropin is administered upon theoretical grounds since the discovery by Dr. W. M. Barton of its elimination in the sinus secretions.

Local treatment, by far the most important, should be guided by principles underlying Nature's own methods of recovery. It will comprise:



- I. Measures applied to the nasal passages.
- II. Measures applied directly to the sinus cavities.

1. Measures applied to the nasal cavities will have chiefly as their aim the keeping free of the ostia of communication between nose and sinuses so that ventilation and drainage shall be unimpeded.

For the removal of such masses from the nasal passages, irrigation with warm saline solution has long enjoyed favor with the specialists. It is agreeable as well as effective and it is quite likely that in addition to cleansing the nasal passages, it operates at the same time to produce some aspiration upon the sinus cavities.

Another method which is grateful to the patient and yields splendid results in liquefying the thickened secretions and favoring their removal is the steam inhalation.

Special steam inhalers are not necessary, as one may use the ordinary tea kettle, set upon an alcohol stove. By folding a towel in the shape of a cone or cornucopia, the steam can be more effectually delivered to the nares. The decongestion of the membranes is favored by the employing for vaporization a solution of a small amount of menthol in alcohol to which may be added a few drops of chloroform.

When obstruction is due to acute inflammatory swelling of the membrane about the orifice, it is quite allowable to use powerfully acting stringents, such as cocain and adrenalin, to tide over the inflammatory swelling. However, care should be taken to limit the application to the region of the ostia, which for the anterior group of cells is in the hiatus semilunaris; for the posterior, in the superior meatus. Sometimes the infundibulum is choked by the presence of thick secretions, in which circumstance the frontal sinus probe may do good service.

Many cases of sinusitis have developed the more readily because of the presence of certain local lesions or abnormalities which encroach upon the sinus apertures and with the slightest additional swelling lead to their occlusion.

Therefore, we shall often find it necessary, if we will have permanent results, to cut away some portion of the middle turbinal, to ablate polypoid growths, to remove a septal spur or correct a septal deviation.

2. Direct treatment of the sinusal cavity.

Naturally the first thing that comes to mind under this heading is the removal of the stagnant secretions, which, especially when abundant, thick and viscid, will defy ciliary action and other physical forces destined to effect their removal.

In some cases the sinuses can be irrigated directly through their natural openings in the nose. In the case of the maxillary sinus, this method is quite unsatisfactory, because of the high location of its ostium, wherefore the usual practice is to make a puncture by means of a specially constructed trocar under the anterior portion of the inferior turbinate.

Another means of evacuating the sinus, which has lately been recommended and is now used with considerable success by many rhinologists, is of strong negative pressure within the nasal cavities, which, acting through the ostia, tends to aspirate the secretions from the accessory cavities. Various apparatus have been devised for this purpose, the negative pressure being obtained by electric motor, by pneumatic power, or even by the use of the simple rubber bulb.

A satisfactory and yet at the same time simple instrument is that of Mucks, which is used in the Max Halle clinic in Berlin. The suction bulb is of extra strength and resilience and connects by means of a soft rubber tube with a special glass reservoir having a tip that fits snugly into the anterior nares. If the patient is directed to swallow or utter K. K. K. just as the compressed bulb is released, the palate will adjust itself against the pharynx and convert the nasal fossa together with the nasopharynx into a closed cavity. Negative pressure is therefore exerted upon all the sinuses if only the orifices are unobstructed. In addition to the therapeutic uses, such an apparatus renders often some service to diagnosis, for observation of the nose immediately after its use will give us frequently a clue to the particular sinus or sinuses affected, because of the pus thus brought to view.

The chief drawbacks to the use of the ordinary suction apparatus are, first, that the force necessary to be effective is generally attended with considerable pain, and, second, we cannot exclude the Eustachian tube from its action.

For this reason we will often do better to use attachments applied to the region of the orifice or inserted directly through it into the sinus cavity. The author, therefore, for some time has been devoting to this purpose sinus canulas which he devised

several years ago, after numerous measurements and studies upon the human skull, and which then were thought of only for the purpose of irrigation.

A very ingenious apparatus has been designed by Dr. Lewis Coffin,<sup>2</sup> of New York, which, in addition to producing suction or negative pressure in the sinuses, will actually deliver medicated vapor to the sinus interior. This is accomplished by virtue of an arrangement which enables one to shift suddenly from negative to positive pressure and vice versa.

The instrument consists of two bottles, one a vacuum bottle, and the other containing the medicament, attached to the same tube. The connecting tube has a switch key by means of which its lumen may be connected with either bottle. At the proximal end one can attach the cut-off for compressed air, while between the two bottles is another smaller tube for attachment of the rubber tubing connected with the exhaust pump.

In order to operate the apparatus it is necessary to have a pump such as that of Sorensen's which will give at the same time both positive and negative pressure, and it is important, moreover, in addition to the regular compression gauge to have interposed in the tubing connected with the exhaust end a vacuumeter which will enable one to measure and regulate the force of suction.

When the nozzle of the apparatus is pressed lightly into one nostril, the other being closed, and the patient directed to say Kak, Kak, Kak, one can by turning the switch-key one way produce a very effective partial vacuum in the nasal fossa and throughout the nasal sinuses wherever the communicating ostia are open.

Then suddenly turning the switch-key, one instantly gets positive pressure causing a volume of medicated vapor to enter the nose, and, according to a well-known physical law, to rush into and fill up the partially vacuumized sinuses.

The author first became acquainted with this apparatus through a personal demonstration by Dr. Coffin about two years ago, shortly after it had been invented, and impressed with its apparent usefulness, began at once to employ it in private practice and has continued to do so daily ever since. He cannot but feel that it is a very valuable addition to the armamentarium, since under its use he has gotten some brilliant results, not only in acute and recent cases, but in some old chronic forms of sinusitis which under

ordinary conditions would seem to have demanded surgical procedure.

With regard to medication, Coffin has used chiefly carbolic acid and iodine preparations (iodex, iodine petrogen, etc.), and an oil loaded with Bulgarian bacilli.

The author has used for the most part two formulæ: in the recent cases a preparation containing salol, 1 per cent, camphor-menthol, 2 per cent, in benzoin, and in the older cases a preparation of camphorated phenol, 2 per cent, in a 10 per cent preparation of iodine.

We trust the advocacy of certain non-surgical methods will not be construed as committing the writer unreservedly to their universal application.

Every intelligent surgeon, of course, recognizes that there are cases beyond the pale of conservative measures and for which surgical treatment is definitely indicated. When there is present a polypoid degeneration of the interior lining or a phlegmonous cellulitis of the overlying tissues, we may infer that there exists a necrosis of the osseous wall of the cavity which would probably never yield to anything short of thorough surgical measures.

It has been said that we cannot be sure in any case that such a condition does not exist.

But this must be construed as an argument for the use of conservative measures rather than the contrary, because if we do not know that the sinuses are so slightly affected that conservative measures will prove successful, neither can we be sure that the pathological processes are so far advanced that operation is unavoidable. Certainly it is better to employ conservative measures in a case which later must be operated upon than to operate upon a case which could have gotten well without it.

We are convinced that the latter is to-day of far too frequent occurrence and that if the measures which we here advocate should be more often given a faithful trial the number of operations found necessary would be very materially lessened.

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**THE PLICA TRIANGULARIS AND ITS MORPHOLOGIC VARIATIONS. A CAUSATIVE FACTOR IN THE PRODUCTION OF FOCI OF INFECTION AND IRRITATION.**

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That the plica of the fauces is deserving of more attention from laryngologists than the subject has recently received is the thought that inspired the following brief commentary in relation to that important membrane.

Embryologically and pathologically the plica triangularis has its analogy in the prepuce. Both develop about the beginning of the third month of foetal life and at birth they should have sufficiently receded to cause no interference with the function of adjoining organs.

The plica triangularis is attached to the superior border of the posterior pillar, and to the posterior edge of the anterior pillar and is inserted into the lateral aspect of the tongue (Fig. 1). With the forward growth of the tongue before and some months after birth the plica may be reduced so that it has apparently disappeared (Fig. 2). The writer thinks that the size of the plica is governed to some extent by heredity. The plica triangularis varies in size from an inconspicuous border along the anterior pillar to a size covering the greater part of the tonsillar fossa as in early foetal life.

Normally the tonsillar fossa is not entirely filled by the tonsil and there is perfect drainage in the anterior, superior and posterior spaces, the plica having sufficiently receded so that it covers no part of the tonsil (Fig. 3). Many have for a number of years observed that where the plica has apparently entirely receded, the tonsil rarely if ever causes trouble, hence we designate it the normal tonsil.

Let us now consider why it is thus so inoffensive and a joy to its possessor. The crypts in this tonsil are drained at frequent intervals because of the constriction of the superior constrictor and the palatal muscles at the base of the tonsil during the acts of deglutition. The normal tonsil is rarely inflamed except when it becomes so in common with other membranes of the throat. Systemic infections are undoubtedly rare and quinsy probably never occurs in this kind of tonsil for it is almost certain that infection of the lymph and blood streams and peritonsillitis are infections through and of

the mucous glands, of the capsular and pericapsular tissues, whose ducts do not open into the tonsil but around it.

In spite of the statements in textbooks to the contrary, it has been shown by Labbe, Serugue, Von Levenstein, Frankel, Maclachlan\* and others that the mucous ducts open at the periphery of the tonsil. This being true the condition of the plica becomes of the greatest importance to every laryngologist when the question of tonsillar infection is under consideration. In the normal tonsil where the plica has apparently entirely disappeared, there are no crypts in the tonsillar fossa where detritus may collect to become infected and where bacteria may find entrance through the ducts to the mucous glands. It is unmistakable that the drainage of the peritonsillar spaces is of greater importance than that of the tonsillar crypts.

However, it does not matter whether we are considering the drainage of the sinuses in the tonsillar fossa or the crypts in the tonsil, we have the plica to deal with, because it is the plica that determines the normality or the pathogenicity of the tonsillar region. The only exception there might be to this statement, in my opinion, is in the large pedunculated tonsil and I am not sure that an exception should be made here for I have found detritus in the anterior fossa of large pedunculated tonsils which greatly reduced in size when the abnormality of the plica was removed.

When the plica is sufficiently in evidence to interfere with the normal drainage of the peritonsillar spaces it is of ample size to prevent normal drainage of the crypts.

Keeping in mind that the persistent plica triangularis is attached to the entire posterior border of the anterior pillar and that it is inserted into the lateral aspect of the tongue, it is obvious that when the tongue moves backward in deglutition the plica is carried with it and the anterior pillar is pulled to the inner side of the tonsil instead of allowing it to slide to the outer side as it does when the plica has normally receded. This prevents the normal draining of the crypts of the tonsil, and also forms retention cysts containing pathogenic bacteria in the anterior and supratonsillar fossa which may readily infect the mucous glands.

There is apparently no relation between the growth of the tonsil and the size of the plica. A large tonsil may have a large plica (Fig. 4) or a plica scarcely visible (Fig. 3). A small tonsil may be accompanied by a plica undiminished and covering the greater part of the tonsillar fossa (Fig. 1). The size of the plica is as variable as that of the tonsil.

If by operating on the plica the foci of infection through the mucous glands have been disposed of and the tonsillar crypts left to drain normally, which enables the tonsil to dispose of the pathological condition that has been forced upon it, the object of our endeavor has been attained. The rules of surgery that apply in operating on other organs of the body should be applied in disposing of the pathological conditions found in the fauces.

That the pathological conditions formed in the faucial regions are due to the deformed plica in the majority of cases is apparent, and the writer believes that consideration of the embryology, pathology and clinical history gives credence to the proposition. The established anatomical and pathological facts impel the conviction that the removal of this deformed membrane is the scientific procedure in disposing of most foci of infection in the faucial region, and its feasibility commands our consideration.

That the last word has not been said on the tonsil problem we all believe, though a more thorough study of the plica gives promise of more light on this vital subject. The disposition of foci of infection, by removal of the essential part of the plica, possesses the merit of safety, is theoretically correct when properly performed, is clinically efficient and bears promise of relief for many members of our profession of the criticism of removing an organ whose function is unknown.

The writer wishes to suggest that the unreduced plica may be a focus of irritation as well as forming a diverticulum harboring a focus of infection. When the plica covers a large portion of an ordinary sized tonsil the pressure against this membrane is very considerable for the plica resists the efforts of the constrictor muscle in pressing the tonsil inward between the palatal arches in the act of deglutition.

After the plica has been severed patients often maintain that they can swallow more easily than before, that they do not experience the drawing sensation in their throats that they formerly did.

When the plica triangularis has been partly removed, many patients are keenly sensible of reattachments that take place and the writer thinks that this is suggestive of a former irritation produced by that membrane of which the patient was not cognizant.

Reasoning *a priori*, may not many of our brilliant recoveries following tonsillectomy be the result of partly destroyed plica and therefore of removed foci of irritation? It may happen that the unreduced plica triangularis is at times as much a focus of irritation as is a redundant prepuce.



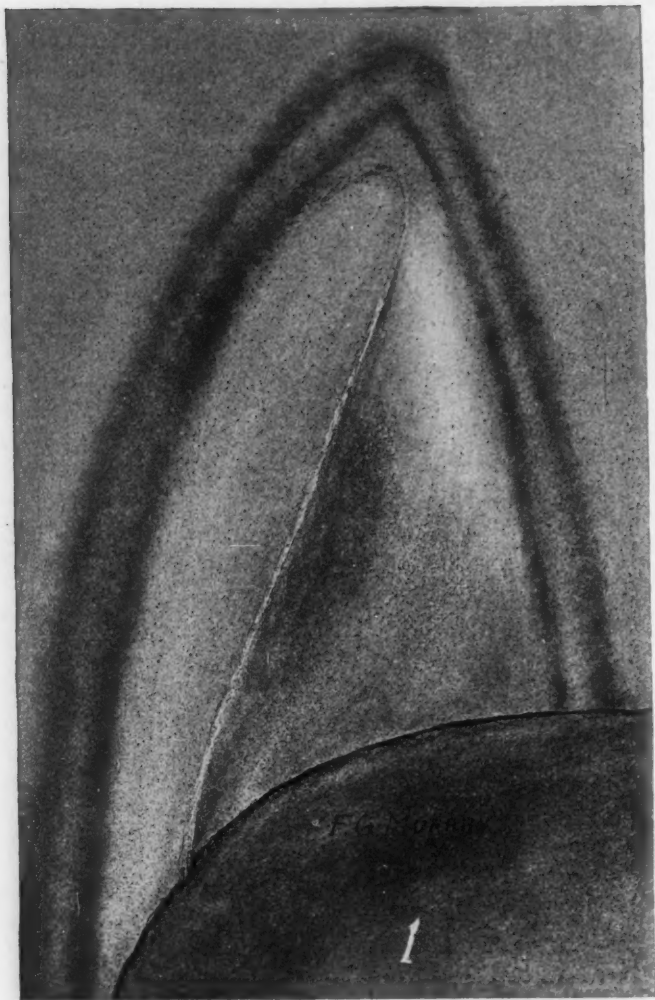


Fig. 1. Showing unreduced plica triangularis and undeveloped tonsil. Upper portion of plica is unattached to wall of fauces producing a diverticulum and culture bed for bacteria. It is usually necessary to use a blunt-pointed bent probe to make a diagnosis of this condition.

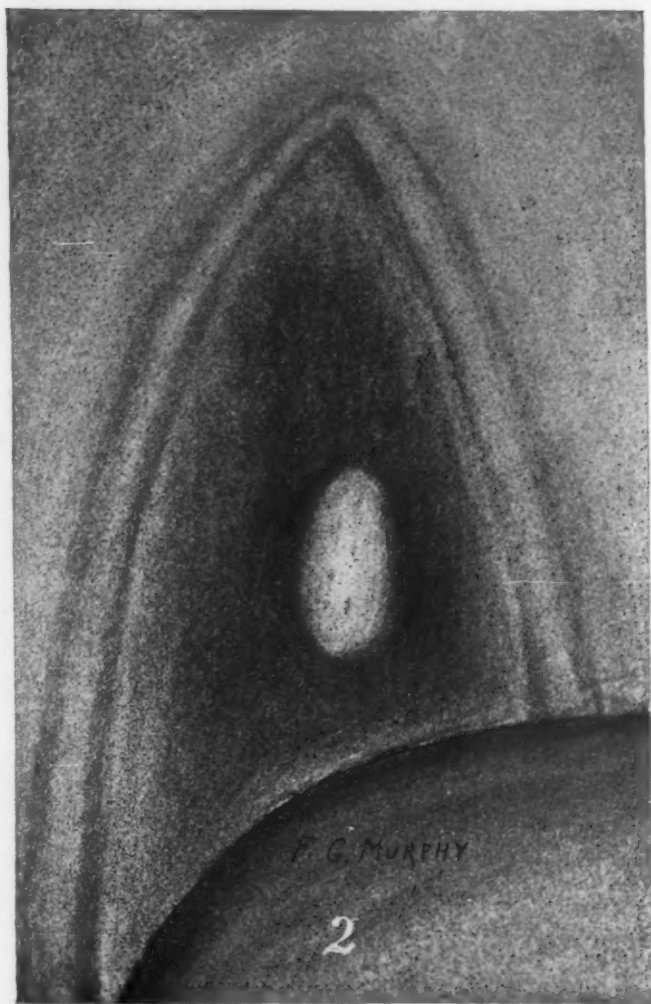


Fig. 2. Showing plica triangularis apparently entirely reduced. Tonsil much atrophied or undeveloped and undoubtedly considered by most laryngologists a normal tonsil. The plica is never absent though it may be reduced to an inconspicuous border along the anterior pillar.

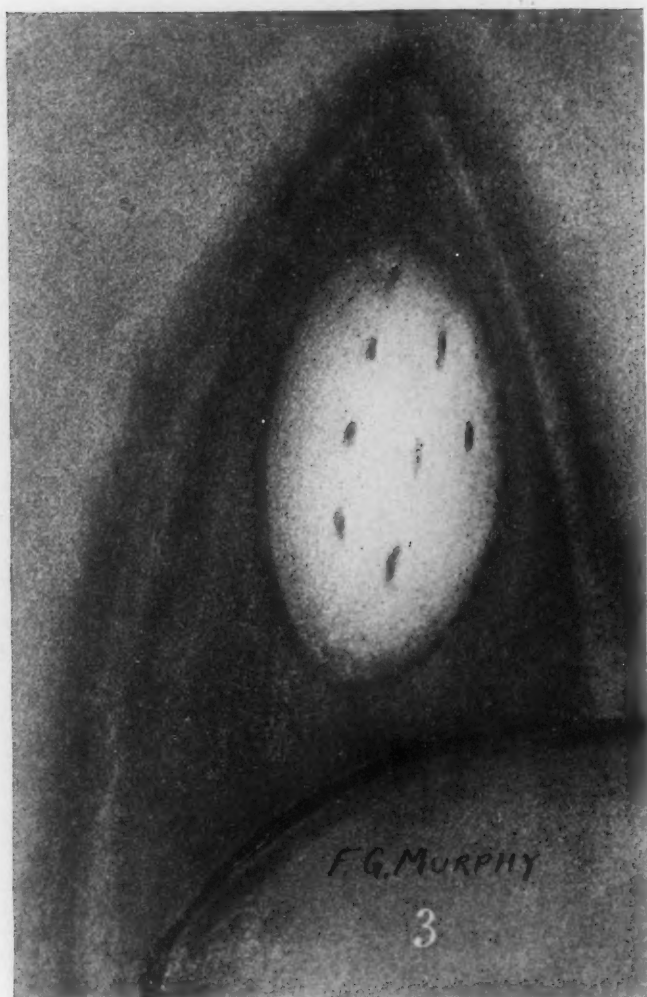


Fig. 3. Fairly large normal tonsil. Plica triangularis not apparent. There are no faucial crypts to serve as culture receptacles for bacteria, eliminating the probability of peritonsillar and systemic infection through the mucous glands in the peritonsillar regions.

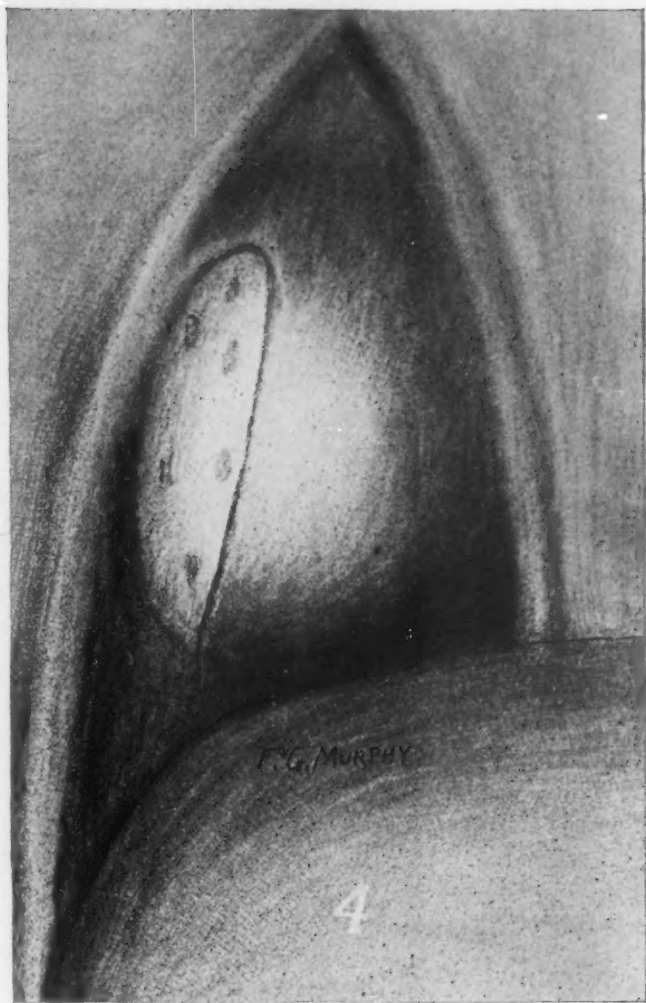


Fig. 4. Persistent plica triangularis enveloping large tonsil as in a sling. Detritus collecting between the plica and the upper and anterior parts of the tonsil, harboring pathogenic bacteria, and predisposing the patient to quinsy and systemic infection.

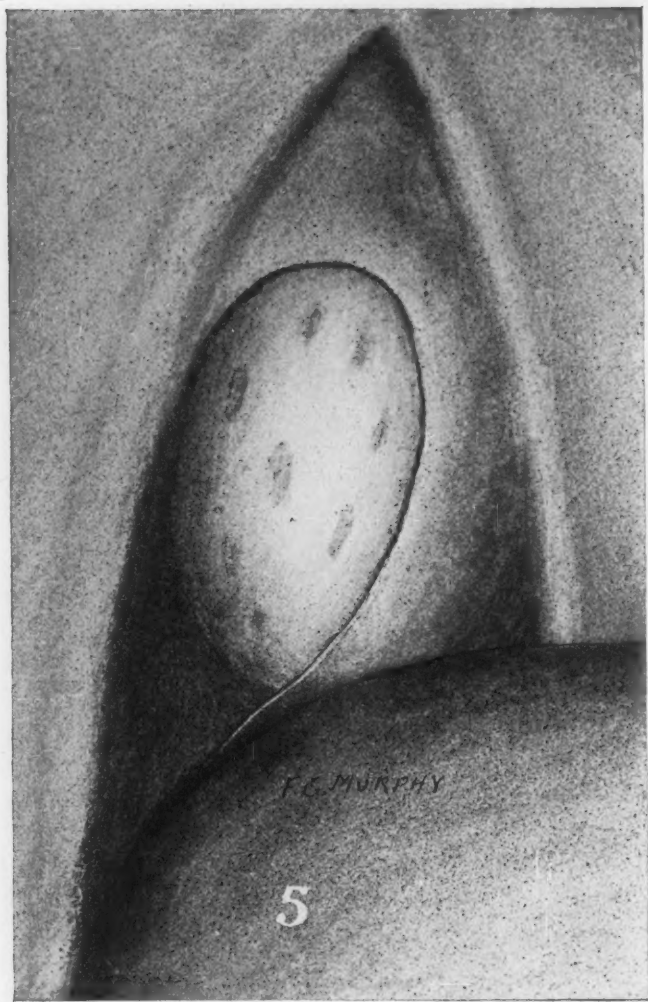


Fig. 5. Plica is more reduced than in Fig. 4. It is in persistent plica of this type that crypts containing pus are to be looked for between the tonsil and the upper portion of the posterior pillar, as much as in the supra tonsillar and the anterior fossa.

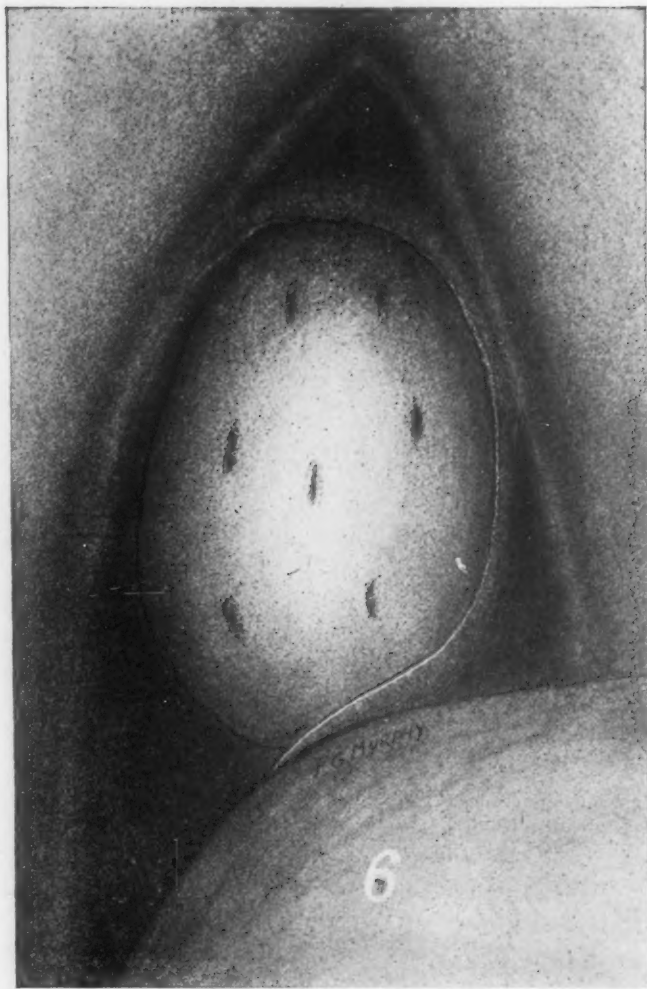


Fig. 6. Showing only rim of plica triangularis around the tonsil in its superior, anterior, and inferior portions. Plica is attached to lateral aspect of the tongue, and draws the anterior pillar inwards in deglutition, preventing perfect drainage of the tonsillar crypts.

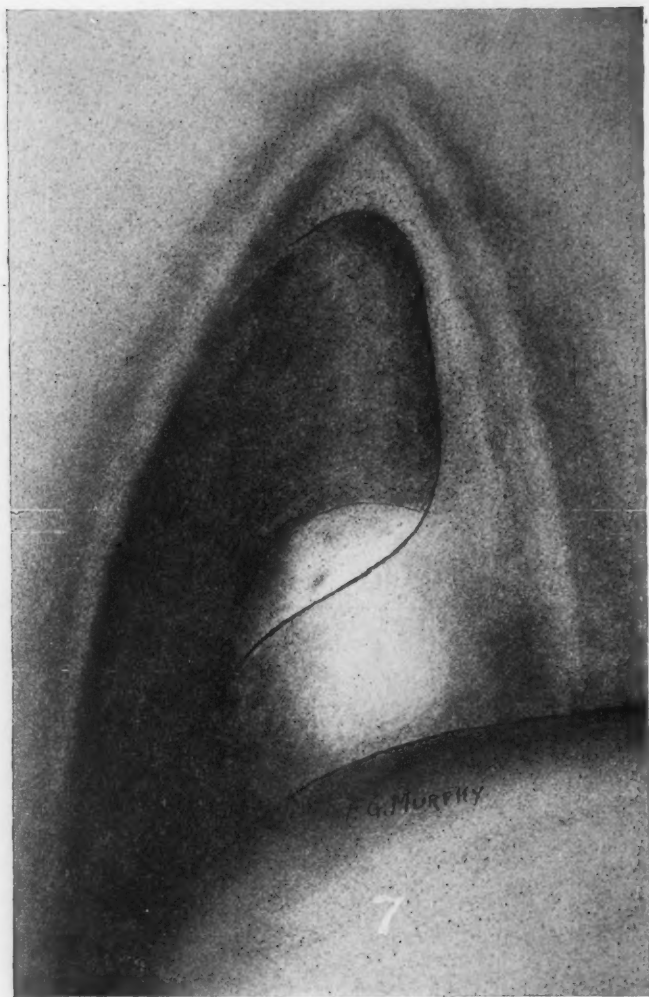


Fig. 7. Showing developed lower lobe of the tonsil. Foul smelling, cheesy substance is invariably found in the sinus between the tonsil and the anterior pillar, and enclosed by the plica. Superior lobe or tonsil not in evidence. There is perfect drainage in the supratonsillar fossa.



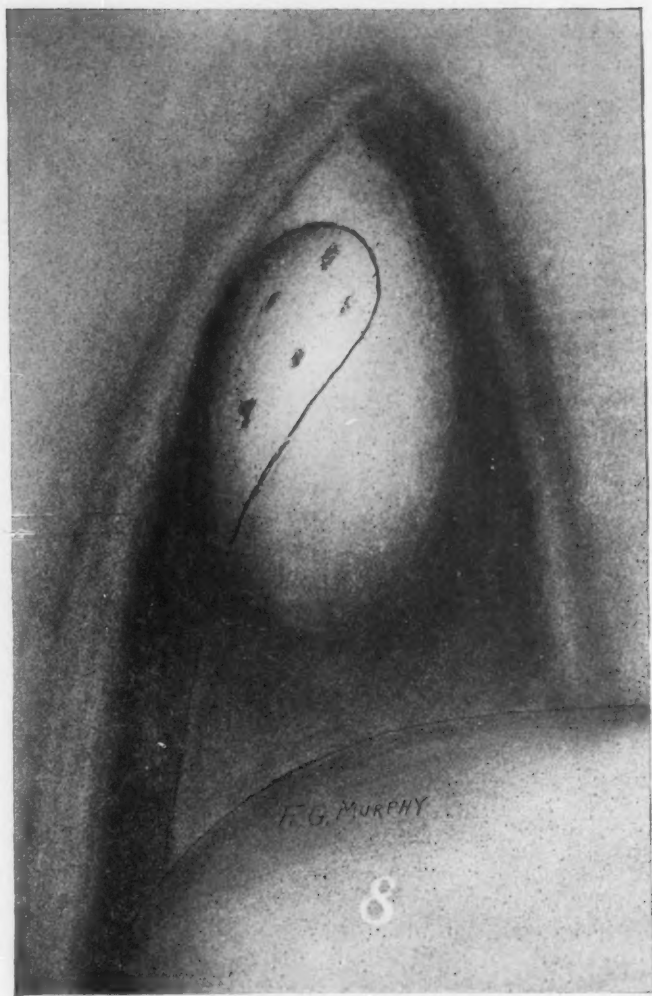


Fig. 8. Showing developed upper lobe of tonsil partly enclosed by the plica, which becomes attached to the wall of the fauces between the tonsil and the base of the tongue. The plica is always unattached to the faucial wall above the tonsil though its adherence below is constant.

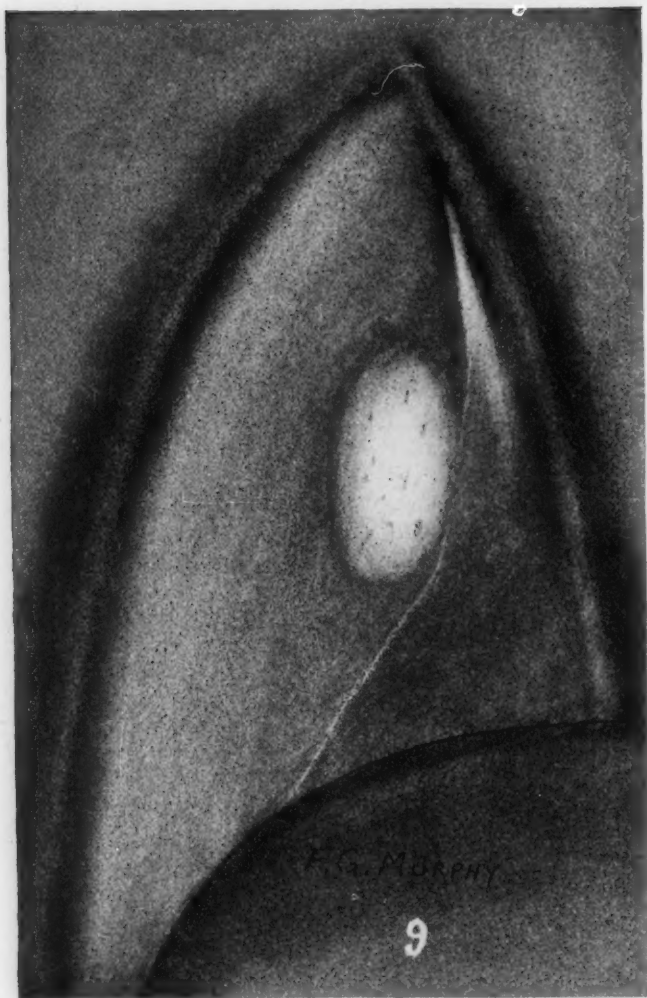


Fig. 9. Atrophied tonsil with plica so little in evidence that the deep crypt behind the anterior pillar can be discovered only by the use of the round-pointed bent probe. This condition is more frequently found in older people whose tonsils are in a condition of advanced atrophy.

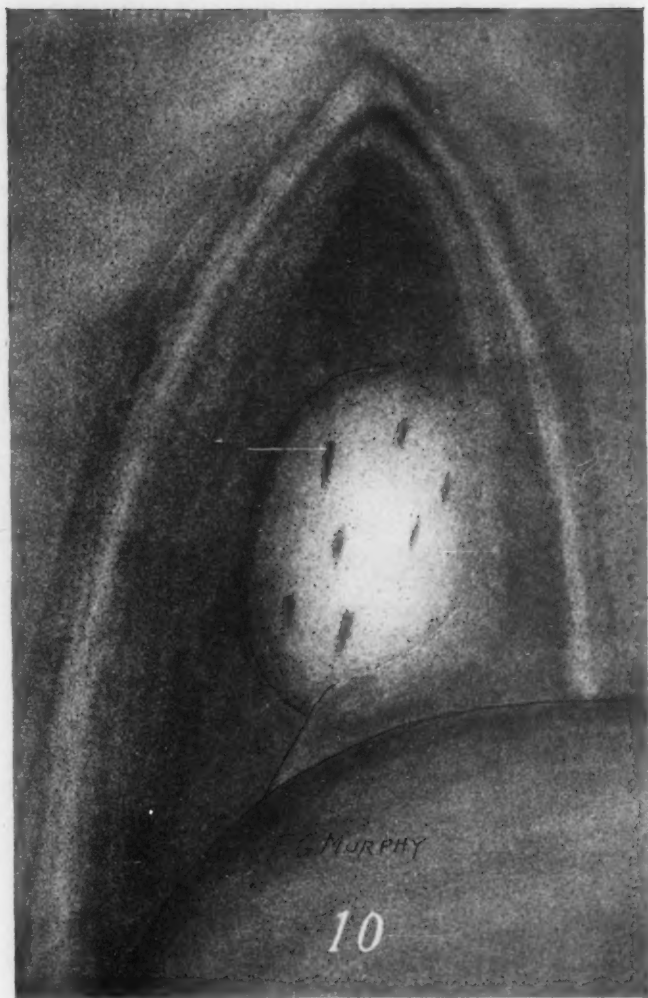


Fig. 10. Showing tissues of the plica blending into the tonsillar epithelium, causing line of demarcation to become obscure. In the writer's experience this kind of plica predisposes to chronic peritonsillar abscess, though the tonsil may be nearly normal in appearance.

## RELATION OF THE GLANDS OF INTERNAL SECRETION TO OTO-LARYNGOLOGY.\*

DR. JOSEPH C. BECK, Chicago.

Our aim to-day shall be to bring before you this complex subject in the form of a plea for the recognition of the importance of these glands in oto-laryngologic practice, in the broadest sense. Not only do we ask you to recognize them as important but we wish to present our studies and investigations in such a manner as to enable you to co-operate in order that we may come to some definite conclusions.

The subject is a very large one and consequently in order to cover it we will only bring out the vital and practical points, leaving the details for some future time. We will attempt, however, to cover the entire subject in a general way and expect, from time to time, to take up the affections of individual glands as related to the ear, nose and throat. To-day we only wish to discuss the hypophysis in detail.

I will first describe our own studies on ductless glands, and subsequently Dr. Pollock will take up a consideration of the literature of the subject. The principal conditions that we shall consider are:

1. Hyperadrenalism and hypoadrenalism.
2. Hyperthyroidism and hypothyroidism.
3. Hyperthymism and hypothyism.
4. Hyperpituitism and hypopituitism.

From this outline it will be noted that the four great glands which we are considering as causing disturbances are the thyroid, thymus, hypophysis and adrenals.

The various other structures that are considered as ductless or endocrinal glands or partly so, such as the pineal, parathyroids, ovaries, testicles, liver, etc., we will not take into consideration at this time.

The various oto-laryngological subjects that we will consider are: (1) Atrophic rhinitis. (2) Hyperplastic or non-suppurative sinusitis in which we have (a) hay fever, (b) hyperesthetic rhinitis with or without hydrorrhea, (c) asthma. (3) Septal deflection and excrescences. (4) Oto-sclerosis. (5) Exophthalmic goitre. (6) Myxedema. (7) Status thymicus and lymphaticus. (8) Epilepsy. (9) Acromegaly. (10) Froehlich's syndrome.

\*Read before the American Academy of Ophthalmology and Oto-Laryngology, at Memphis, Tenn., Dec. 11-12, 1916.

As stated before, in the study of these glands, it is not our purpose to take up any other part of these diseases except that which concerns the oto-laryngologist, and then only the essential points. That these glands of internal secretion play an important part in the human economy there can be no doubt. When, for instance, the thyroid is secreting excessively, there is development of rapid pulse, marked exhaustion, etc., and should one administer a dose of thyroid extract, one would see how very much these symptoms are aggravated. A dose of pituitrin will unquestionably cause marked contraction of non-striped muscle fibres particularly of the uterus. Again, a deficiency of thyroid secretion will be very quickly shown by symptoms of myxedema and when thyroid extract is given, these symptoms quickly disappear. Many examples could be described of the specific action of these glands, but that is scarcely within the province of my part of the program and will be taken up by Dr. Pollock. There is still a very important portion of the work unfinished and that is the determination, either by chemical or other tests of the blood or other secretions, as to whether an individual has an excess or deficiency of any one or more of the glandular secretions.

The pathological changes supposedly due to alterations in the internal secretions are also of conclusive evidence of the relationship, and that has been the basis of most of our work. I have special reference to the bony changes found in the nasal and ear structures. At the conclusion of Dr. Pollock's paper I will demonstrate some of the conditions.

Two glands are known to have a specific influence on bone growth and they are the hypophysis and adrenals. The thymus, too, has some influence on the nutrition of bone. From our histo-pathological findings of the turbinates, septum and internal ear, compared with the histo-pathology of the bones of the rest of the skeleton in conditions in which the glands of internal secretions are disturbed, as, for instance, in osteomalacia, acromegaly, etc., we have found that there is an analogy that is worth while following up. In other words, the pathological changes in the bony capsule of the labyrinth in otosclerosis are analogous to the bony changes in osteomalacia and to a certain degree in the turbinated structure in the diseases mentioned above, as well as in the bony changes of the septum at the point of deflection and ridge formation.

What does that all mean? Simply that we believe that in conditions such as atrophic rhinitis, hyperplastic ethmoiditis whether we have hay-fever, hyperesthetic rhinitis or asthma; in otosclerosis

and septum deviations the same etiological factor plays the part and the treatment should be the same.

1. *Atrophic rhinitis.* Several years ago I observed that this condition occurred mostly in girls or women and that many of these patients had small thyroids. I began empirically to feed them on thyroid extract and they showed some improvement. I then referred every case of atrophic rhinitis (genuine ozena) to Dr. Pollock to follow out this line of treatment and this he has done, employing the thyroid, thymus, adrenal and hypophysis glands in a systematic manner, that is to say, not all at one time in any sort of a dose, but in particular combinations and dosages. This he reported in 1912. We have not ignored other methods of treatment, particularly the bacterial or vaccine, but have found no specific benefit from that treatment alone. However, in combination with organo-therapy there appears to be better results obtained. One treatment that is beneficial in atrophic rhinitis which I may be pardoned for mentioning here is the surgical. I have recently employed a method to supplant the intra-septal injections of paraffin, which I believe to be original, although Dr. Iglauer reported some transplanting experiments a few years ago. We simply do a septal resection of cartilage and bone through a small slit. Then through an ear speculum introduced into this slit we pack small pieces of fascia (no fat).

Our theory as to the etiology of atrophic rhinitis, which applies also to the other conditions about to be described, is about as follows: Primarily there is a chronic focus of infection. This may be intestinal, tonsillar, dental, or in the sinuses, etc. This focal infection produces marked changes in some of the glands of internal secretion, thus disturbing their entire harmonic action. In consequence of this disturbance there result certain pathological changes particularly in the bony frame work, in this case, in the turbinates. It is mostly a rarefying process. The mucous membrane covering these bones undergoes a secondary degenerative change and in atrophic rhinitis a metaplasia of the epithelium. Finally, there develops a low grade infection of a great variety of organisms among which there is the so-called specific foetid bacillus of ozena.

We therefore give these patients either by mouth or hypodermatically, glandular extracts alone or in combination, for a period of from one to six months and after a lapse of time, say from one to three months, we repeat this treatment. It is noteworthy that at times there does not appear to be any effect from the treatment while at another time the same treatment is followed by striking

results. Why that is so we have not been able to ascertain nor can we even suggest a theory, although there are explanations to be found in the literature.

II. *Hyperplastic ethmoiditis or non-suppurative sinusitis.* In the majority of cases we have found the same rarefying process of the middle turbinate and ethmoidal cells as in atrophic rhinitis. The mucous membrane covering this bone, however, becomes degenerated in the form of a pseudomyxoma, otherwise known as polypoid. The usual accompaniment is excessive irritability of the nasal mucous membrane, which produces the marked sneezing usually followed by an excessive watery discharge. The pathological change is not so marked in hay-fever as far as rarefaction is concerned, nor do we find any great changes in the mucosa unless the symptom of asthma is present. The large number of cases of so-called bronchial asthma that the oto-laryngologist encounters, have invariably the clinical picture of a non-suppurative sinusitis. At first no polypi are visible but later almost always. Histo-pathologically there is present the rarefying change of a hyperplastic ethmoiditis. We believe, therefore, that these three conditions are due to the same cause, namely, a hyposecretion or disharmony of one or more of the glands mentioned above and that the underlying cause is a focal infection. We believe that the infection is most frequently from the intestinal tract; that these patients are sensitized particularly to protein or albumin and have attacks such as sneezing and asthma which is a true anaphylaxis. That there is a deficiency in the glandular secretion may be explained by the fact that when we administer a large dose of adrenalin to a patient in the attack of asthma, he is frequently relieved. It has been claimed that this is due to the action of the drug, by raising the blood pressure or as an antispasmodic; but we believe it is a temporary satisfying of the hyposecretion. The treatment, of course, is to remove the original cause, namely, the focus of infection, and to administer glandular extract to temporarily satisfy the system. The local nasal pathology is taken care of; a middle turbinectomy or ethmoid exenteration are as a rule, sufficient. However, no permanent cure of any of the conditions mentioned can be obtained by any of these operative procedures alone, so far as we have observed.

III. *Oto-sclerosis.* About five years ago while studying the histo-pathology of this disease on some specimens presented to me by Drs. Gray and Neumann, I noted the similarity of the spongy-fing process in oto-sclerosis to that of osteomalacia, arthritis deformans and the bones in early months of pregnancy. I also found



that experiments were being carried out on the treatment of these general processes by the administration of adrenalin, thymus and pituitary extracts and good results reported. We began the same therapeutic experiments on a few cases of oto-sclerosis and made our report before the Southern Section of the American Otological, Laryngological and Rhinological Society at New Orleans in 1913. Since that time we have been employing these glandular extracts routinely in every case of suspicious or clearly diagnosed oto-sclerosis. Adrenalin has been the principal substance employed, although in a good many cases we combined the extracts of the adrenal, thymus and pituitary. Recently Dr. Smith of Delta, Colorado, told me that he has been using the pituitrin exclusively with good results and believes that it acts as an aid to the harmonic action of the other glands. Although we have the records of several cases in which there is no doubt that there has been improvement by this treatment, we have never claimed that we have cured a case of oto-sclerosis nor even improved the hearing. Furthermore, we have the statements from otologists who have treated some cases by the use of adrenalin, of improvement in the hearing as well as in the tinnitus aurium. What we do claim is this: that cases of oto-sclerosis treated by injections of adrenalin 1-1000 solution from 1 to 15 minims in gradually increasing doses have shown a tendency not to progress. The injections should be controlled by measurement of the blood pressure and should be given every second or third day for a period of six weeks to three months, then interrupted for the same period of time, then resumed for the same period and then stopped. We have further removed foci of chronic infection, particularly from the tonsils and teeth, in such cases and obtained more permanent relief. Most of these cases were not treated by us by any other methods, such as inflation or medicines. In some of these cases we administered the pituitary and thymus gland extracts as well. As will be shown later in Dr. Pollock's paper, long-continued use of adrenal extract is said to produce an arterio-sclerosis, but in all these years we have seen no evidence of this affection clinically from such employment nor have we had any other untoward results.

About two years ago before the Middle Section of the American Laryngological, Rhinological and Otological Society I reported on the value of roentgenography in oto-sclerosis and stated that I was able to demonstrate the spongification process. I called attention to the use of this method to control the progress of the disease by repeating the roentgenography, thus determining if there has been any further involvement.

IV. *Septum deflections with excrescence.* We make no positive claim that the etiologic factor in septum deformity is disturbance of the glands of internal secretion, but we do positively state that in the examination microscopically of deviated septa and excrescences we find the same rarefying process as in the turbinated bones, the internal ear, osteomalacia, etc. Since there is no definite etiologic factor for deviation and excrescences of the septum, may we not be permitted to theorize on the basis of true pathological conditions in their analogy that disturbed internal secretions may have something to do with it? A practical point is, may it not be prevented from developing?

V. *Exophthalmic goitre or thyrotoxic conditions.* This affection is treated by the neurologist, internist, general surgeon, ophthalmologist and oto-laryngologist because the symptomatology as well as the treatment is so varied and manifold. So far as the oto-laryngologist is concerned, it is the recognition of the earliest symptoms that he is concerned with, as well as carrying out the real beneficial treatment. Many of these patients come to us with headaches and ear noises and in many instances they have been improperly treated by operation or treatment within the nasal cavity or by inflations of the middle ear, none of which have proved of any permanent value. If one does recognize the other cardinal symptoms of hyperthyroidism as rapid pulse, fatigue with prostration on slight exertion, tremor, perspiration, diarrhea, and the fine soft skin, especially of the hands, whether there be exophthalmos or thyroid enlargement or not, one will be able to make the correct diagnosis. One or two doses of thyroid extract will markedly increase all the above symptoms and the administration of the serum or extracts of thyroidectomized animals will relieve them at least temporarily. The surgical treatment has and still does hold sway because the results are so striking from the ligation of the thyroid vessels with subsequent resection of part of the gland in the bad cases, and the immediate removal of part of the gland in the not far advanced cases. Our results from these procedures have shown us that they are not permanent and our observation of many operated cases elsewhere show the same. We have, however, some of these recurrent cases as well as many others not operated on, that were subjected to a tonsillectomy, that do show no tendency to recurrence. There is one case in our experience worth while mentioning very briefly, that shows the value of tonsillectomy in this affection. I was called by a competent general surgeon and an equally competent internist to see a case of far-advanced exophthalmos, to examine the

tonsils with the idea that these may be infected, and if so, if they could be washed or treated so as to improve the general condition of the patient in order that a ligation of the thyroid vessel might be done. The resident physician gave me a wrong message, stating that I should come to the hospital and remove the tonsils from that patient. This I did, without any hesitancy, since I knew these gentlemen to be judges as to the indications in the removal of tonsils, and consequently never even examined the throat before operation. There was nothing unusual about the operation except that she was a very nervous patient. When later in the day the surgeon and internist found out what had been done, they became very much alarmed, and, of course, expected an exitus, but to-day, four years since the operation, the patient is permanently cured of the hyperthyroidism.

*VI. Myxedema.* I have had two cases of myxedema in which there were marked laryngeal symptoms in that the voice became very much changed. In one of them, that of a lady who previously had a pleasant high voice, the voice changed to a deep, manly type. There was nothing to be found except a suggestion of the cords being hypertrophied, but not inflamed. The other case was one of a man who suffered from adeno-carcinoma of the larynx and was subjected to thirty deep penetration x-ray treatments over the region of the thyroid, following the removal of the growth under suspension laryngoscopy. The symptoms of myxedema disappeared following the administration of thyroid extract, twenty grains daily for six weeks. Another point of interest is the non-recurrence of the carcinoma (three years). The use of thyroid cured this condition permanently.

*VII. Status thymicus or status lymphaticus.* As stated before, we believe that the lack of thymus secretion has something to do with the rarefying changes in the bones and that we employ it in the treatment of such conditions. As to true diseases of this gland we are most concerned in the lymphatic dyscrasias and the occasional pressure symptoms on the trachea. In all cases of infants where we find marked glandular enlargement particularly with enlargement of the tonsils and adenoids we are suspicious that there is trouble with the thymus. Consequently, we have in the past eight years not operated on any of these cases radically. We usually refrain from operating on them at all, and if a tonsillectomy and a partial adenectomy is performed, it is done without any anesthetic. We have further adopted a rule not to operate on infants or children under three years of age unless extreme indications are pres-

ent. We have been much criticised by the profession, especially some of the pediatricians, for this view, but we have the records of enough cases to show that it is not good practice. There are four fatalities among them, none of which we operated, but saw in consultation; three died within five weeks from symptoms resembling marasmus, and one very much like a cretin. We have seen a fair number of cases of infants that had tonsils and adenoids removed radically, following which there was a marked fattening of these babies, to the delight of the doctors and parents, but subsequently it was found that these children were somewhat backward in mentality and contracted colds and other diseases of infancy much more easily. On inquiry, we have seldom had similar experience expressed by other physicians.

*Epilepsy.* This subject is of interest to the laryngologist because cases have a great many times been reported in the literature of certain growths within the nose and throat such as sharp spurs on septum, adenoids and tonsils, which when removed, cured the case of epilepsy. We have had a number of such cases but not in a single instance did we have any result from such treatment. I wish to call attention to the work of Dr. Crile, who reports marked improvement in grandmal following the removal of an adrenal gland. What is the cause of this hyperadrenalism? Is it a chronic focal infection? If so, where is it located?

The discussion of the hypophysis from our personal experience will be continued by Dr. Pollock.

In conclusion I wish to apologize for the manner, on account of its vastness, in which I had to present this important subject, but for its timeliness I have no apology to make.

2551 North Clark Street.

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**Aural Typhoid Carriers.** A. B. BENNETT, *Jour Amer. Med. Assn.*, Jan. 6, 1917.

Two cases are reported of this rare condition. In both, living typhoid bacilli were cultivated from the ear discharge. One of these cases, a fifteen year old child, had never had typhoid. The patient suffered an attack of purulent otitis media which left a chronic discharging ear, from the discharge of which typhoid bacilli were isolated. Treatment consisted of local antiseptics combined with typhoid vaccine. The first case was improved but was lost trace of before a cure could be established; the second case was cured.

ED.

**IMPORTANCE OF THE INTERNAL SECRETIONS IN EAR,  
NOSE AND THROAT AFFECTIONS WITH SPECIAL  
REFERENCE TO THE HYPOPHYSIS.\***

DR. HARRY L. POLLOCK, Chicago.

As you have learned from Dr. Beck's paper, the great problem which confronts us in our work with the ductless glands is the difficulty or rather the inability by any laboratory examination to determine whether we are dealing with a hyper- or a hypo-secretion of one or more of these glands.

It is only by clinical symptoms which present themselves after a great change in the glandular secretion has taken place, that we are able to judge approximately what gland or glands are affected. Not until the physiological chemists can definitely tell us by examination of the blood and the various excretions or secretions, whether there is a deficiency or an over-production of the secretions, will we be able to put our treatment of these glandular disturbances, on a rational basis. However, the knowledge of these mysterious structures has been gained experimentally in a two-fold manner. *Firstly*, by an overfeeding or implantation of the glands themselves in animals and noting the difference between the animals so fed and the corresponding controls; or *secondly*, by removing or partially removing the glands by surgical methods and then observing the results obtained thereby. In the beginning this latter was very difficult owing to the fact that it was almost impossible to reach or remove these glands without the animals dying from the immediate effect of the operation, usually from shock, *i. e.*, before the symptoms arising from the removal could be studied. The thyroid and parathyroid could be removed very easily and safely and the effects studied, but when the removal of the hypophysis, the thymus, the pineal gland or the suprarenals was attempted, the animals usually died so quickly that results from the effects of the surgical interference could not be obtained. For instance, Restelli, who in 1845 first attempted to study the effect of the removal of the thymus, lost ninety-two of ninety-eight animals operated upon and the remaining six lived but such a short time that no conclusive results could be obtained. After aseptic surgery was introduced and surgical technic improved, the animals so operated upon lived until they either

\*Read before the American Academy of Ophthalmology and Otolaryngology, at Memphis, Tenn., Dec. 11, 1916.

er died from the effects of the loss of the secretion or were killed in order to obtain and study the pathological conditions and changes brought about by the lack of the necessary ductless gland secretion. During the past decade so much has been written upon these various glands, that an attempt to review the entire literature would occupy too much time and it is not in the province of my paper to do so, but I will attempt in a few words to give you the status as it is now accepted by most of the authorities with, however, a more detailed study of the hypophysis. As the thyroid is the most accessible, and the disturbance either of a hyper- or hypo-secretion is known to all of you, I will not discuss this gland except to state that a hyper-secretion results in the condition described first by Basedow and known as exophthalmic goiter, which has been described to you by Dr. Beck. A hypo-secretion in children results in cretinism and in adults, in myxedema. All authorities agree that to be in perfect health all the ductless glands must work in harmony and when one or the other is working excessively or not secreting sufficiently, the glands are thrown out of harmony, *i. e.*, they must undertake to supply the deficiency so caused or an antagonistic gland will secrete excessively, as the inhibitory influence of the affected gland has been removed. We know that the suprarenal as well as the hypophysis acts as a check upon the thyroids and vice versa, and that often when the suprarenal is destroyed or secreting too little, the hypophysis will hypertrophy and attempt to replace in the economy, that which is lacking by reason of the insufficiency of the suprarenal. To what cause this disharmony is due, is still an open question; yet when we at times see such brilliant results obtained by the removal of some focal infection, we can not but believe that these focal points play a great role in the causation of the disharmony and must always be taken into consideration when we study these cases. As Dr. Beck has already explained our views on this subject and given illustrations thereof, I will only emphasize this one point—*search carefully for various focal points of infection in any change in the ductless glandular secretion.*

*The thymus.* This organ formerly was supposed to be an embryonic one and upon birth was expected to gradually retrograde. Karl Basch, in 1902, in experimenting upon dogs which he found were best for his work upon the thymus, discovered that this gland continued to develop for at least four weeks after birth, and then retrograded very rapidly. In the human the retrograde action occurs until puberty when the gland is supposed to have disappeared.

If the animals were operated upon after the fourth week, few, if any, changes occurred in the subsequent growth, but if the gland was removed previous to the fourth week, marked changes in the development took place. The change took place mostly in the bony structures. The bones became soft and weak and the animals could not stand. There was a loss of the calcium salts and when a fracture was produced it healed very slowly and the union was usually a fibrous one and it took months before there was a gradual bony union.

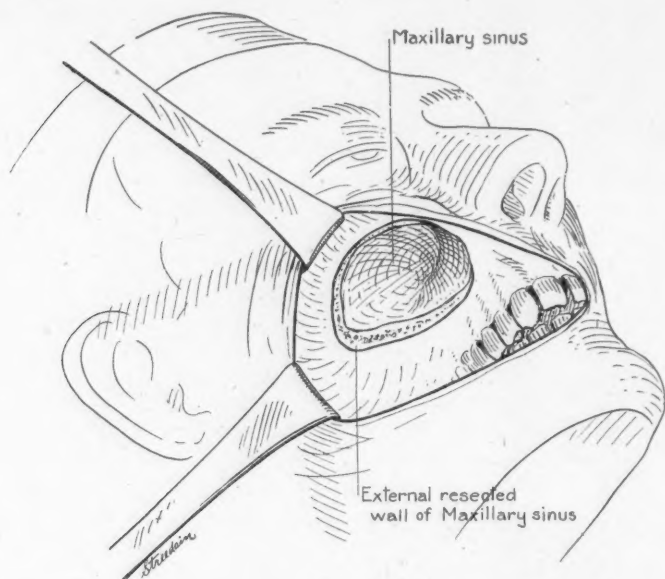


Fig. 1.

This condition corresponded strikingly with the rickets of children. The extirpation of the thymus also heightened the irritability of the nervous system. The thymus also has a distinct relation to the sexual apparatus as shown experimentally. A persistent thymus shows an undevelopment of the genitalia, a castration showing a persistent increased size of the thymus. On the other hand, intravenous injections of thymus extract, manifests itself as a depressant to the heart, a slowing of the pulse, and a fall in blood pressure until death resulted. Post-mortem findings always showed a clot in right ventricle extending into the pulmonary vein which was reported to be the cause of the death. If however, medicine (Hirudin) was



first injected which tended to prevent clotting of the blood, a similar lethal dose of thymus could be injected without any symptoms whatever. Sudden deaths from ether in status lymphaticus or persistent thymus is caused by this blood clotting in the right ventricle and if anti-clotting medicine (Hirudin, for example) be first employed, this danger can be obviated.

*The suprarenals.* This gland has been studied since Addison, in 1855, first described the disease which bears his name, in which he described the etiology as due to the destruction of the suprarenal glands. Many animal experiments have been made by the

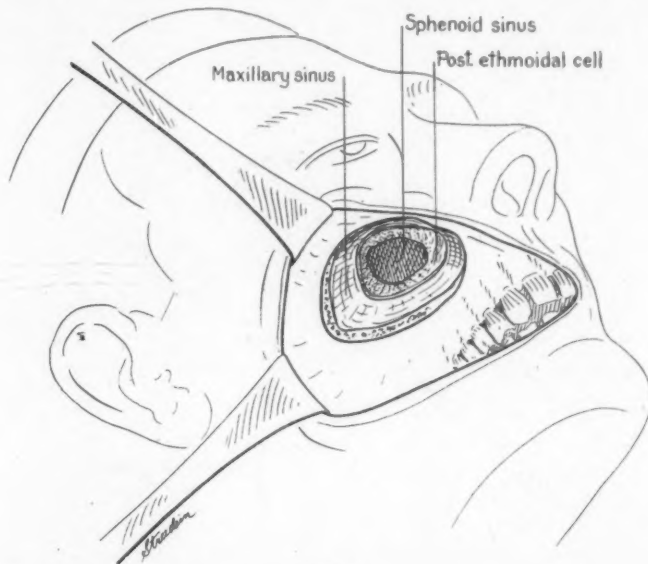
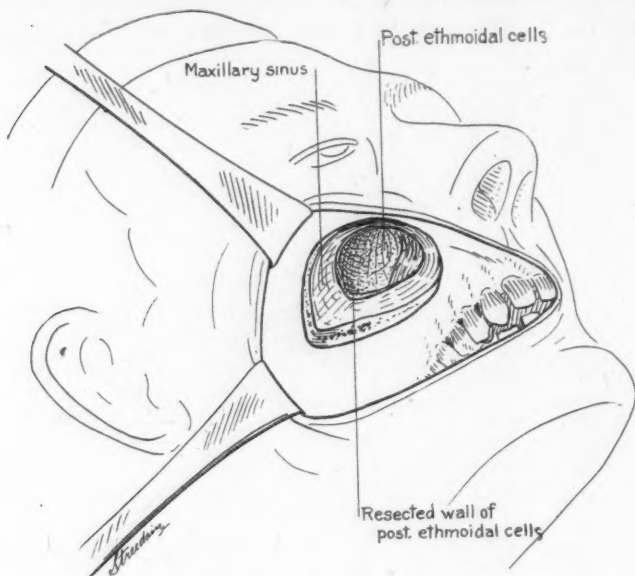


Fig. 2.

total removal of both the cortical and medullary portions, but it is impossible to remove either portion separately as they are so intimately connected. Histology proves to us that the main secretion arises from the medulla and from this the extract is obtained. The symptoms from the removal of this gland are a progressive muscular weakening and a malaise. There is a cardio-vascular asthenia shown by a gradual weakening of the heart action, and very often but not always a pigmentation of the mucous membrane and skin. The study of the effect of adrenalin upon the various organs, excretions, blood and metabolism is so complex that I will not attempt to

describe this in detail but only those which are of interest to us as oto-laryngologists.

The first effect of an injection of adrenalin is the immediate rise of the blood pressure and this is brought about by a constrictor action on the wall of the vessels themselves and not by a stimulation of the heart. This is so thoroughly proven experimentally that the suprarenals are called the glands of the blood vessels. The action on the vessels is of short duration and very often succeeding the



constriction there is a dilatation shown by a fall in the blood pressure. Long continuation of these adrenalin injections causes a necrosis of the middle layer of the arteries and a deposit of lime salts therein and arterio-sclerosis is now thought to be due to an effect of the overproduction of the suprarenals, *i. e.*, a slow poisoning by the gland secretion. Of greater importance to us as we shall see is its action on the bones.

Bossi found experimentally that in sheep in which one gland was removed there resulted in a few days symptoms of osteomalacia, *viz.*, proso-phaturae and osteo-porose which was proven by x-ray pictures. He utilized this discovery practically, *i. e.*, he treated cases of osteomalacia with adrenalin injections and found that his

patients recovered completely and this is now accepted as the rational treatment of this disease.

By the courtesy of Dr. Carl Beck I have some lantern slides of a case of osteomalacia which will be shown and in which the patient fully recovered after hypodermic injections of adrenalin. What value has this knowledge to us as oto-laryngologists? We know histologically that in oto-sclerosis, in the early stage there is an osteoporosis of the bony labyrinth, the same histo-pathological condition as in osteomalacia. If adrenalin can cure these latter conditions, why can it not do the same in oto-sclerosis? It is based

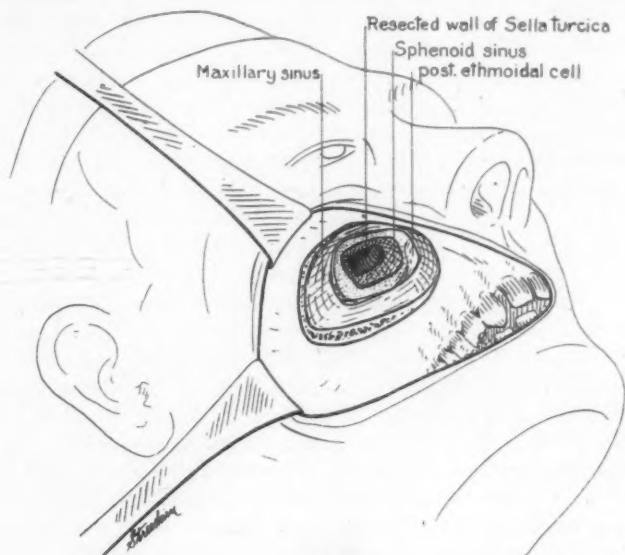


Fig. 3.

upon these facts that we are employing this treatment in our cases of oto-sclerosis as well as in the other conditions outlined by Dr. Beck.

In a paper read last winter before the Clinical Society of the North Chicago Hospital, I drew attention to the pathological action of the various ductless glands upon the autonomic nerve system and explained the theory why an irritation of this system would cause an attack of asthma and why an injection of adrenalin would abort same. I am still doing work along this line, but as it is at present only a theory, I will not go into details at this time.

*The hypophysis.* As has been mentioned before, this is the gland that we desire to discuss more in detail as you will see that in its pathological changes and the various operations to which it is now subjected, it is in closer contact with the rhinologist than are the other ductless glands.

*Anatomy.* Situated in the sella turcica it is composed of three parts. The anterior or glandular, the posterior or nervous and the pars intermediare composed partly of both lobes. One would that the active physiological therapeutic extract lies in the post-suppose that the anterior glandular lobe would be the portion which produced the main secretion of the gland, yet such is not the case, as it has been proven experimentally that the posterior lobe furnishes the principal physiological therapeutic extracts. The action of the extract is very similar to adrenalin, but differs in some of its actions upon the various organs of the body, in which they act antagonistically. For instance, the action of both are increased as mydriatics when used jointly; upon the muscles of the intestines, the adrenalin contracts, the hypophysis relaxes and when used together the combination has a neutral effect.

The action of adrenalin on the circulation is far stronger than that of the hypophysis, yet the latter acts longer and can be used indefinitely while there is great danger in continuous use of adrenalin. Not until recent years were experimental operations for the removal of the gland successful. It was presumed that following the total removal of the glands, the animals died from the absence of the necessary secretion but later it was found that such operations could be done and the animal survive. Although we know terior lobe, this portion can be removed with impunity and the animals show but little change, but if the greater portion of or the complete, anterior lobe is removed, the animals immediately remain stationary in their development, there is a great deposit of fat and a non-development or a retrogression of the genitalia.

Clinically and that is what interests us mostly, we are able to distinguish two distinct conditions of the hypophysis, one a hyper secretion and the other hypo secretion.

P. Marie was the first to connect the condition of acromegaly with a hypophyseal tumor and he thought that the disease was the result of a hyposecretion as the gland was destroyed by a tumor formation, such as sarcoma, carcinoma, adenoma, glioma, etc. This was soon shown to be incorrect as many cases of acromegaly showed an apparent normal condition of the gland upon post-mortem examination, and by Roentgen examination the sella was

found enlarged. It was soon found that this disease was caused by a hyper secretion but not necessarily an enlargement of the gland. Just as we find a hypersecretion of the thyroid in Basedow's disease with usually a very small thyroid gland. This was further proven correct in several cases where there was an improvement in the condition after a removal or partial removal of a tumor of the anterior lobe.

Hochenegg, in 1908, cited the first case of acromegaly in which the hypertrophy was removed by the nasal route in which there was a diminution in size of hands and feet noticeable within eight days after operation. Within three months there was a complete recovery.

Since then others have cited similar results. We have recently seen a typical case of acromegaly of long standing, in which the x-ray showed an enlargement of the sella and a disappearance of the clinoid processes. The patient consulted us on account of his laryngeal condition. His voice became husky and at times he had impairment of breathing. Upon examination of the larynx by suspension laryngoscopy we found an immense hypertrophy of the mucous membrane of the entire larynx, so that it hung in folds. The microscopical section of a removed portion showed hyperplasia of the mucous membrane and the underlying tissues.

This case has already been reported in detail by Dr. Beck before the Chicago Ophthalmological Society and will appear in the current number of the *Annals of Ophthalmology*; but I simply desire to call your attention to this unusual condition of the larynx which I am unable to find mentioned anywhere in the literature. This case proved to be a mixed one, *i. e.*, while a true case of acromegaly he had had his thyroid removed many years before and subsequently developed a lingual thyroid which a second surgeon removed a short time ago. He then developed symptoms of myxodema.

I now desire to call your attention to another condition, the etiology of which is supposed to lie in some disturbance of the hypophysis, but of which we have no definite proof, *viz.*, diabetes insipidus. Many authors have shown that a disturbance of the pars intermediare either by injury, pressure, or disease will in a large percentage of cases be followed by diabetes insipidus.

The condition of hyposecretion was first described by Froelich in 1901, which he called dystrophia adiposa genitalis. It is now universally known as Froehlich's syndrome. It occurs mostly in young male adults; is characterized by a deposit of fat over the

entire body but especially in the breasts and over the pubes. An atrophy of the genitalia and a corresponding loss of its function and a falling out of the pubic and axillary hair also occur. Naturally, with this comes the eye symptoms of any hypophyseal tumor, *viz.*, a bi-temporal hemianopsia, resulting in complete blindness if the condition is not corrected. One of the noticeable co-existing conditions is the great tolerance to sugar. These cases can ingest an immense amount of sugar, without any showing in the urine.

In this connection I desire to report a case of this kind which I have just operated upon by the method first suggested by my associate, Dr. J. C. Beck, and presented before this Society at the Chattanooga meeting in 1913. This consists of attacking the sella turcica by the antro-post-ethmo-sphenoidal route.

*Case Report.* Mr. O., aged 32 years, referred to me by an otolaryngologist of Vancouver, B. C., on Nov. 7, 1916, gave the following history:

Married seven years, no family.

For past six months patient has been gradually getting blind. In right eye is unable to tell light from dark and in the left eye is partially blind. Condition came on gradually, blindness starting from outside of eye and going inwards.

Weight of patient markedly increased during the past two years, especially around the abdomen. Never had heavy beard or mustache; has not at present. Skin not dry, only scalp quite dry and hair falling out. Appetite enormous. Bowels regular. Urinates quite often and more than the usual amount.

Patient does not complain of headaches, nor does he perspire. Finger nails all right. Cannot breathe through nose very well.

*Nasal examination.* General turgescence through nose. Septum fairly straight. Ridge low down on left side. Turgescent inferior turbinate.

*Teeth* in repair in excellent condition. Pharynx normal. Degenerated small tonsils.

*Ears.* Has little difficulty in hearing in right ear. Examination of same shows slight amount of cerumen present.

Left ear same condition.

*Advise* x-rays, thorough blood and eye examination.

The Roentogram showed a flattening out of the sella and a disappearance of the post-clinoid process.

The blood examination was as follows: Red, 4,800,000; white, 8,000; differential, small lymphocytes, 34 per cent; large mononuclears, 5 per cent; poly. morphonuclears, 61 per cent.

The amount of a twenty-four hours' urine specimen was normal; 1,800 cc. and no pathological findings.

I referred the patient to Dr. Harry Gradle for eye examination and he reported as follows:

*Right eye:* Complete blindness.

*Left eye:* The temporal half gone, on the nasal half the field was constricted for all colors.

*Ophthalmoscopically:* Right eyes, fundus normal, except for a slight dilatation of the veins.

*Left eye:* Advancing secondary atrophy of the optic nerve. Impossible to measure blind spot as this is included in the scotoma.

Patient was given two hundred and fifty grams dextrose and urine found to be free. Two days later three hundred and fifty grams of dextrose given and again urine found to be free, showing an increased tolerance for sugar.

The diagnosis of a hypophyseal tumor having been established, an operation was advised. As before stated, I decided that the best and safest operation was the one suggested by Dr. J. C. Beck. This consists of attacking the sella by the antro-posterior-ethmo-sphenoidal route, and has the advantage over other intranasal methods, in that the space through which we work is much larger and at least one to one and one-fourth inches closer to the sella, than any other intranasal method.

Therefore, on Nov. 12, 1916, I did a preliminary left-sided middle turbinectomy and a thorough ethmoid exenteration. I chose the left side as the tumor was pressing more on the right side, as shown by the complete right-sided blindness.

On Nov. 21, 1916, I completed the operation as follows:

Exposing the anterior wall of the antrum through the canine fossa in the usual manner, I removed the wall with the electric burr. Then with a curette I broke through the post-ethmoidal wall at the junction of the sphenoid, entering the sphenoidal cavity. After breaking down the septum dividing the two sphenoids, I attacked the postero-superior portion of the sphenoid with a special long electric burr and took away the roof, thus exposing the hypophyseal region. A soft tumor mass was felt but I decided not to attempt to remove it at this time, depending on the effects of the decompression, and if necessary, at a later time to remove it completely.

Patient made an uneventful recovery from the operation, but too short a space of time has elapsed to expect any great amount of improvement in his symptoms.



This is the third case of hypophysial tumor which we have operated upon by this method, the former two having already been reported by Dr. Beck. The first case, a cyst of the hypophysis, now, after two and one years has had a great improvement in all his symptoms and is working every day, something impossible for months prior to the operation.

The second case recovered from his operation, a tumor of the hypophysis (sarcoma) having been found, but succumbed to the disease some months after leaving our care.

2551 N. Clark Street.

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**Don'ts in Hemorrhage and Blood Diseases.** MAURICE CHIDECKEL,  
*Medical Record*, March 10, 1917.

Some of the important "don'ts" for the rhino-laryngologist are the following:

Don't always blame the nose for epistaxis; many constitutional diseases will cause nosebleed.

Don't give any fatty substance for relief of constipation in bleeding patients; the fat when absorbed may interfere with coagulation.

Don't fail to estimate blood pressure in patients with hemoptysis or epistaxis.

Don't rely on calcium salts in any form of hemorrhage.

Don't give a favorable prognosis when there are skin hemorrhages in diphtheria; it signifies a general toxemia and the result is invariably fatal.

Don't use ergot intravenously in any form of bleeding; the cardiac muscle may be paralyzed by its action.

Don't fail to administer citric acid in all conditions where thrombosis is threatened; it lessens the viscosity of the blood and prolongs coagulation.

Don't give coagulen in any hemorrhage unless well diluted (1 gm. to 10 c.c. distilled water).

Don't resort to plugging the nares as a first means of stopping a nasal hemorrhage; application of strong vinegar is very efficacious.

Don't employ adrenalin when there are other means at hand; it is only a temporary vasoconstrictor, soon becoming a vasodilator, leading to a renewed and greater hemorrhage.

Don't forget that quinsies and suppuration of the pharynx may lead to very serious hemorrhage.

Ed.

### THE CAMPAIGN VOICE.

DR. L. D. ALEXANDER, JR., New York City.

Some idea of the bodily and vocal strain required of a candidate for high office in this country may be obtained by considering that in the recent campaign extending approximately three months, thirty-two states were visited, about 30,000 miles in train and automobile travel, and over 500 speeches made.

Such a program as this requires extreme physical fitness and involves great mental and vocal strain.

In spite of modern conveniences and comforts as represented by special train and hotel accommodations, to the candidate probably not accustomed to extended travel the strain is indeed severe.

Sleep on the train is never restful as schedules must be maintained. This involves if not moving, parking in some noisy station or adjacent yards, often on the next track to a cattle train, or other noisy freight.

At times a night is spent in a hotel where surroundings and bed are strange. Sleep, therefore, is one rather from exhaustion than of peaceful nature.

Meals as obtained even on a private car are irregular and often times principally of canned goods; so, too, interruptions of one sort or another are always occurring.

Lack of appetite and constipation are natural sequelae to this irregular sort of life. The mental powers of a candidate are put to a great strain. Unending conferences, interviews, letters and telegrams, newspaper articles, criticism, all play their part and take their toll.

To offset this, is the stimulus of the goal in view, the plaudits of press and people. I have seen a candidate after a day of mileage and speeches attend the evening meeting exhausted and weary, and in a state of extreme mental tension, return to the train, soothed by the applause of the audience; weary, yes, but mentally relaxed.

After a few days' use, the voice lacks luster and is devoid of head resonance. Occasionally in the midst of a sustained sentence there occurs a distinct break due to the lodgment of mucus. The further effort dislodges this and the voice clears for a time. The prolonged effort of speaking causes a congestion of the entire head. A distinct external congestion of the nose is noted while examination

immediately after speaking reveals turgescence of the turbinate bodies and congestion of the entire membrane. Speaking in overheated and underventilated halls requires so much effort that frequently the candidate is in a dripping perspiration at the end of his speech.

Examination of the throat at the end of a day's speaking reveals a state of congestion from pharynx to trachea; the palatal pillars and uvula are relaxed. The false cords are congested, the true cords are congested and slightly edematous with accompanying partial paresis.

A sticky secretion, mucoid in character and very adherent, may be noticed between the arytenoids and in the adjacent trachea. Attempts to remove this cause a frequent dry cough which, if not relieved, may cause a restless night.

A laryngologist is part of the necessary equipment of a modern campaign, and I shall try to outline the duties which are expected of him, together with the medical treatment indicated.

It is advisable to make a thorough examination of the patient if possible before the beginning of the campaign, to suggest appropriate treatment for such abnormal conditions as may be present. The candidate should be taught breathing exercises which will give the maximum support to the voice with the least amount of effort. I advocate the superior costal elevation with inferior costal and diaphragmatic respiration as described by H. Holbrook Curtis. Particular attention should be addressed to the voice. I believe that even at the sacrifice of pleasing quality, the patient should be taught to speak using fully his facial resonators. The voice should be pitched in the medium register or slightly lower and well forward. Speech should be slower than ordinarily with careful enunciation. I employ vocal exercises in humming with consonant phrases such as ming, mong, ding, dong, maw, mo, etc. (Curtis). These latter are sung for a few minutes several times daily.

Such exercises strengthens the laryngeal muscles, and if learned in advance will prove of great benefit should future need call for their use. I am in the habit of letting the patient select an imaginary spot or person about equal to the distance well back in the average theater audience and practicing throwing the voice at that spot.

Unfortunately, one rarely has the opportunity of seeing the candidate until perhaps called to go on tour with him.

The attending physician should carry with him appropriate equipment including a first-aid outfit and minor surgical and medical ap-

pliances; for should occasion of emergency arise he may be called upon to treat things outside of his specialty. A modern campaign train may carry as many as sixty or seventy people, consisting, besides the candidate and possibly his family, of secretaries, stenographers, newspaper representatives, local politicians and service.

A fairly extensive office-outfit should be taken, some sort of compressed air apparatus is advisable. A steam inhaler, ice bag and the customary set of examining instruments, spray solutions and atomizers. I am in the habit of using an alkaline spray, an astringent spray, (glycero-tannin), an oily spray and also argyrol and adrenalin.

I know that the day of the spraying laryngologist is over, and one trip I trusted to laryngeal syringes and applicators. Since many of the treatments are performed on a swaying train running from forty to sixty miles an hour, such delicate treatments are well-nigh impossible. I had much better success with the present apparatus.

It should be the duty of the physician to be near the candidate at all times for in case of emergency he would naturally be the first called upon. One has but to recall the shootings of McKinley and Roosevelt to realize the necessity of this. At the meetings, the method of delivery and condition of voice should be noted.

I make it routine practice to see the candidate twice in the twenty-four hours; once preferably in the middle of the afternoon and before the long speech of the day, and again after he has retired.

The day treatment consists in a thorough cleansing of the nose and throat followed by a laryngeal spray of argyrol directly upon the cords during a deep inhalation. This is followed a few moments later by a few deep inhalations of an oily solution. At this time inquiry is made as to the patient's general condition, and appropriate advice given.

The routine night treatment is a thorough massage of the throat, say for fifteen minutes, gentle alternating stroking movements emptying the jugular veins together with rotary massage over the larynx itself, followed by a steam inhalation of the essential oils and balsam, in an alkaline menstruum. I use with satisfaction for this purpose a Simplex inhaler. The steam application should last from five to fifteen minutes according to the condition of the voice.

Unfortunately, a routine treatment is not usually sufficient to meet the ravages of overuse of the voice. It is necessary that the physician should employ much judgment as to cutting down certain

speeches and eliminating others. The human side of his position is most trying, disappointed politicians and crowds of people who may have come miles and waited sometimes for hours, are not lightly to be disposed of.

It is an occasion where the most important thing, vocal rest, is the hardest to insist upon. However, the physician must be firm in his position and yet must realize how much is at stake.

It is well to remember that the campaign voice is not the singing voice, and that a pretty bad vocal cord can still be made to make a pretty good speech. When the voice is getting bad and the engagements have to be met, I insist on silence or limited whispering between the speeches. The ice cap is of use here, applied for thirty minutes on and thirty minutes off. This is not objectionable to the patient. A hand nebulizer with an oily spray to which a little adrenalin has added is given to the candidate for use just before his speech. Every one who uses his voice seems to think that some throat lozenge is essential. I have little faith in the efficacy of lozenges of any sort in laryngeal conditions. The least harmful and certainly the easiest upon the digestion is a glycerin pastile of lactucarium. These have a soothing effect upon the pharyngeal mucosa and psychic effect of value.

Certain conditions require additional medication. If the paresis is pronounced it is probably due to excessive bodily fatigue. Here, strychnin, one-fortieth of a grain, three or four times daily, should be given, and at 10 a. m. and 4 p. m. additional food in the form of an easily digested broth with a few crackers should be taken. Application of iodine (kali iodidi grains x, tincture iodine one-half oz., glycerin one and one-half ozs.) to the pyriform sinuses and base of the tongue are of distinct value in reducing the congestion present. Care should be taken that the solution does not enter the larynx itself.

When the intra-arytenoid space and neighboring trachea are covered with accumulated mucus, deep inhalations of iodoform in ether, are grateful. If the odor of this is objectionable to the patient, medicated oil may be dropped into the larynx by means of a proper syringe. These solutions do not cause relaxation of the cords as would steam.

Adequate rest in bed is essential and I insist upon at least a half hour's rest in a prone position before the evening speech.

130 West Fifty-ninth Street.

## TRAUMATIC DEFLECTIONS OF THE NASAL SEPTUM AND THEIR TREATMENT.\*

DR. OTIS ORENDORFF, Canon City, Colo.

It is difficult to conclude the exact part that traumatism plays in deflections of the nasal septum. Different observers are prejudiced by the local social conditions and from the angle with which they approach the subject.

At any rate, trauma is undoubtedly quite a factor and its effects may sometimes be added to the influence of heredity, the Gothic Arch adenoids, excessive development of the vomer and stigmata of degeneracy. It is true that careful inquiry will reveal that nearly everyone remembers having suffered a serious bump on the nose at sometime usually in early life and also that nearly everyone has a crooked septum; yet this history should be seriously considered in a study of the case. The etiology is of decidedly practical importance because the old traumatic cases are more difficult to operate upon and are more likely to be followed by perforations because of tough, thick, firm adherent periosteum and the destruction of the normal anatomical relation of the parts and a resulting fibrous matting together of the tissues. There is frequently a dislocation of the columnar cartilage added to a compound comminuted fracture of the septal cartilage, vomer and perpendicular plate. After an injury to the septum there is frequently a large exostosis following what was at first a slight fracture with a small deviation and this has a tendency to increase with time and is more marked when the fracture is sustained early in adult life.

According to Mosher in most deviations due to a symmetry of growth the axis is horizontal and those due to trauma have the axis vertical and are found in the anterior part of the nose.

Unfortunately, we seldom see a fracture of the septum immediately after the accident as the patient is almost always first taken to a general surgeon or if the external parts are not injured and the nose soon regains its normal contour there is frequently nothing done in the way of repair at all. It is only after it is found that the nasal function is not restored or complications have arisen that the patient seeks relief from the rhinologist and by this time adhesions have taken place that may make repair a difficult procedure. On the other hand, my slight experience has taught me that an immediate or early submucous resection would have made a res-

\*Read before the Western Section, American Laryngological, Rhinological and Otological Society, Colorado Springs, Colo.

toration easy, successful and permanent. As an example the different conditions found in traumatic and non-traumatic deflections, quite recently two cases turned up at the same time, both healthy young men of the same age. In one there was absolutely no history of traumatism yet the deviation was so great that one nostril was completely occluded and the obstruction reached from the tip of the nose to the posterior edge of the septum where the ridge was crowned by a down turned lip. Upon operating this case the membranes separated ver yeasily and the actual time was an hour and five minutes with 100 per cent perfect result. The other case had a history of normal nasal function until five years ago when there was a fracture of the septum during a game of football in this city. Since then there have been symptoms of obstruction and as the deviation was not great and the operation seemed simple in spite of the history I advised it and got into a lot of trouble. Along the line of the old fracture the mucous membrane, perichondrium, cartilage and bone were almost one structure and for over two hours resisted the most careful and patient efforts to separate them and a very fine tear resulted in the convexity opposite a badly bruised area in the concavity. After treatment was not neglected yet there is now a beautiful perforation that constantly entertains my former friend with its musical productions. Possibly more ability would have produced better results but the same skill or lack of skill was applied in the other case that was not traumatic and the result was, as stated, perfect function.

Until recently I treated these cases of fracture by replacing the parts as well as possible (and somehow even this was not a satisfactory procedure) and then by attempting to hold them in position by different kinds of splints and tampons which were always a nuisance to both the patient and myself, and after several weeks of suffering he would be discharged with a rough looking job and perverted function and possibly finally require an operation for relief. I have also seen septums that were under the care of others immediately after the accident and the results were no better than my own. These septums are not only gotten back into place with the greatest difficulty but it is very hard to hold them in position without packing that is tight enough to produce distress and possibly necrosis.

In my mind there is an uncertainty about the limit of age in both the young and old at which any submucous resection should be done and this applies to the early repair of traumatic cases also, and should this paper be favored by a discussion I hope that members



of the section will give the results of their experience in the extremes of life as we are warned to be careful especially with children.

Fortunately nature is kind to the noses of young children, for the tissues are too soft to be fractured easily and as the asymmetry of development has not yet taken place deviations are seldom found.

I have cautiously, by means of a sort of modified window resection straightened septums or rather removed spurs in children but not immediately following injuries, and some of them have been watched for several years and there is no deformity. However, I have not done a radical operation in children and have not operated at all under the age of ten years. I believe we would be justified

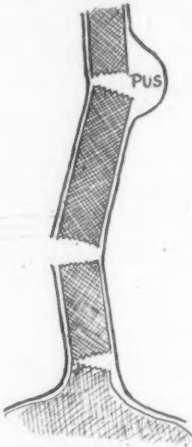


Fig. 1.

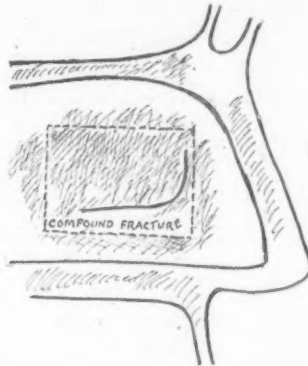


Fig. 2.

in doing a regular submucous operation and if necessary a transplantation of the cartilage in a very young child if the injury were a very severe one and the chances of resulting obstruction were great. While the operative field is small the tissues are soft and elastic and the incision is probably already partially made because of the compound nature of the fracture.

The importance and ease of an early submucous resection was first brought to my attention by a miner 40 years old who was caught in a "cave in" and as he was looking up a timber struck him across the nose about an inch above the tip almost severing the member from the face. He was given splendid attention by a surgeon who replaced the parts and held them with splints and sutures. I saw him about a week afterwards and aside from the swelling, which

would be expected, all was going well, but this induration failed to subside and as there was but little breathing space, and the doctor and the patient insisted, I did an ordinary resection about two weeks after the injury. The torn mucous membrane had healed and the initial incision was made just anterior to it in sound tissue at the usual location. The periosteum readily separated from the cartilage and bone, in fact it was hardly attached to the conglomerated mass that was retained between its surfaces. This mass was shelled out easily and the mucous membrane replaced and rather firmly packed on both sides for twenty-four hours with a perfect result ensuing.

Another case was that of a boy 16 years of age while playing baseball, and incidentally a large percentage of traumatic fractures are due to baseball, football and volleyball, was struck on the nose by a batted ball with sufficient force to produce a compound fracture as shown in the sketch. The injury was followed by considerable external and internal swelling which did not subside as readily as usual and there was constantly a degree or two of fever. After waiting four or five days he was brought to me and operated by using the unhealed wound in the mucous membrane as the only incision, it being sort of an L shape. The perichondrium separated very easily on both sides but to our surprise we ran into a pocket of pus at the upper part of the side of the concavity. There was probably a cc. of it which accounted for the tumor-like swelling at this region which subsided at once. All of the loosened bone and cartilage were removed and the displaced pieces straightened with a resulting septum that was smooth and even on both sides. A light packing was used over-night, temperature was normal the next morning and the patient made a rapid recovery returning to his home in a week.

The treatment of these cases can hardly be classed as immediate resections but I am sure that the earlier that the operation is done following traumatism that the easier and more successful it will be and should opportunity offer and the case be a severe one I shall insist on operating at once.

In conclusion, traumatism plays an important role in septal deflections and old traumatic cases are more difficult to operate and the difficulty increases with the duration of time since the injury.

The irritation caused by these deflections produces a stimulation of the growth of the tissues which acts as a vicious circle.

Prompt resection following a fracture is an easy procedure and affords the earliest relief and quickest recovery.

## FRONTAL SINUSITIS A PROBABLE CAUSE OF ACUTE NEPHRITIS.\*

DR. GEORGE F. KEIPER, Lafayette, Ind.

Last year before the joint meeting of the Middle and Western Sections of the American Laryngological, Rhinological and Otological Society, in a paper entitled "Mastoiditis, a Probable Cause of Acute Nephritis,"<sup>1</sup> I reported two cases in which each instance the mastoiditis was at least an accompaniment of the coexistent acute nephritis and its most probable cause.

As stated in the paper, the literature upon that subject is quite barren. Up to that time but two reports had been made, one by Dr. Joseph A. White, of Richmond, Va., in 1904, entitled, "Report of a Case of Mastoiditis Complicated by Nephritis and Erysipelas," and one by Dr. Thomas Hubbard in 1908, on "Diabetes and Bright's Disease in Relation to Suppurative Osteomyelitis of the Mastoid." Both papers were read before the different sessions of the American Laryngological, Rhinological and Otological Society.

In the discussion that followed the reading of my own paper, Dr. Derrick T. Vail, of Cincinnati, reported an additional case. To date these are all the reported cases.

As a supplement to my own paper of March 2, 1915, I now report a case of "Purulent Frontal Sinusitis Showing Coexistent Acute Nephritis."

Chester H., aged 15, was referred to me by his physician, Dr. George R. Clayton, Jr., of Fowler, Ind., January 11, 1916. I saw the patient immediately after his arrival at St. Elizabeth's Hospital in this city.

His history is briefly as follows: About a year ago his forehead became very tender over the left eye and he was very sick. Under the treatment pursued at that time the patient made a quick recovery after, as his father stated, "the nose broke and ran a large amount of matter." This was evidently a frontal sinusitis. Thereafter he appeared perfectly well until his last illness.

For two weeks prior to his admission to the hospital, the right side of his forehead had been very tender to touch and pressure. Treatment had been of no avail and, at last, yielding to the im-

\*Read before the American Academy of Ophthalmology and Oto-Laryngology at Memphis, Tenn., December 12, 1916.

1. THE LARYNGOSCOPE, May, 1915.

portunities of his family physician he was brought to Lafayette. His forehead over the right eye was very tender to touch and pressure. His mind was confused and times he manifested mild delirium. His pulse was 124 and his temperature was 103.2° F. He was taken to the Roentgen ray laboratory and skiagraphs of the frontal sinuses were made. These were negative.

A blood count was made with the following result: Hemoglobin, 90 per cent; red blood cells, 4,400,000; white blood cells, 18,400.

*Differential Count:* Polynuclears, 86 per cent; small lymphocytes, 12 per cent; large lymphocytes, 2 per cent; eisonophiles, absent; mast cells, absent.

Examination of his urine was as follows: Color, dark amber; specific gravity, 1020; reaction, acid; albumen, present; sugar, absent.

The microscope showed: A few epithelial cells, a few white blood cells, amorphous urates, calcium oxalate crystals, a few granular casts.

For the general physical examination Dr. Frank B. Thompson, of this city, was the consultant. He did not find any lesion of the heart, lungs or blood vessels.

Examination of his nose showed it free from pus. His throat was normal. This was at two o'clock in the afternoon of the day of his admission to the hospital.

At 4:30 p. m. his pulse was 140 and his temperature was 104.2°.

At 7:30 p. m. his pulse was 130 and his temperature was 102.2°.

At 10:30 p. m. his pulse was 144 and his temperature was 103.4°.

January 12:

At 3:00 a. m. his pulse was 140 and his temperature was 102°.

At 7:00 a. m. his pulse was 142 and his temperature was 102°.

At 8:00 I opened the right frontal sinus externally. It was full of pus which was thoroughly cleaned out. No fault could be found in the posterior table of the frontal bone. The fronto-nasal duct was occluded. This was opened and enlarged. His condition becoming bad we gave the nose no further attention and hastily completed the operation and returned him to his room. On recovery from the anesthetic he became very noisy. Morphin sulphate was given him in quarter grain dose to quiet him. This was at 10:15 a. m. Respiration became rapid and the pulse weak. Camphor oil was administered subcutaneously in a thirty drop dose. This accomplished nothing. The delirium deepened for a while and then he gradually failed and died at 3:45 p. m., the same day. No autopsy was permitted.

The pus obtained during the operation was inadvertently destroyed and hence it is regrettable that no examination for its bacterial content was possible.

I have searched the literature for a parallel case in vain. It is barely possible that many more such cases exist and if care is used in making a thorough physical examination, as well as a local one, this complication may be more frequently observed and we will be in a better position to declare that purulent frontal sinusitis may be the cause of acute nephritis. In fact every case that comes before us thus should have all the advantages offered by a complete physical examination.

14 North Sixth Street.

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**Further Observations on the Connellan-King Diplococcus Throat Infections; Their Sequelae with Especial Reference to Arthritis.** JAMES J. KING, *Jour. A. M. A.*, Jan. 13, 1917.

Four cases are described and these show:

1. The frequent presence of the Connellan-King diplococcus in the crypts of the tonsils or at the roots of the teeth in arthritic patients suggests that it may be specific, and that a simple tonsillitis may be followed by very serious complications, due to an absorption of chemical toxins.
2. The danger of a general sepsis following tonsillectomy might be eliminated if a culture were taken from each patient.
3. If the focus of infection in arthritis exists in the tonsil, the treatment should consist in the injection of an autogenous vaccine until all infection is cleared up and then the tonsils should be removed by enucleation.
4. The blood changes in the Connellan-King diplococcus infections seem to be a simple anemia and, in a few cases, a slight increase in the eosinophils from 4 to 6 per cent.
5. In some cases symptoms other than those for which treatment was instituted have disappeared. For instance, in one patient with arthritis and marked ethmoiditis the culture was obtained from the throat. Within two weeks the ethmoiditis had cleared up, while the arthritis was only slightly relieved. Another patient with serious gastric disturbance, who had found it necessary to remain on a strict diet, was able to eat almost anything after she had received the treatment with the autogenous vaccine. Ed.

**CASE OF NASAL PAPILLOMA. SURGICAL REMOVAL  
FOLLOWED BY X-RAY TREATMENT.**

DR. CLARENCE E. IDE, Los Angeles, Cal.

I would like to supplement Dr. Callison's article, in the March (1916) issue of THE LARYNGOSCOPE, on the subject of "Papilloma of the Nose," by reporting a case.

Mr. H. W. F. came June 4, 1915, complaining of obstruction of the right naris by a growth which had been cauterized several times, only to recur. A septal spur had been removed from the right naris eight or nine years previously. Later the patient underwent an operation farther back in the same naris. The same surgeon had then treated the growth by cauterization.

The patient had suffered a nervous breakdown three months before coming for examination in June.

Examination showed a cauliflower growth on the anterior portion of the septum and another at the anterior extremity of the right inferior turbinate bone. The naris was already narrowed by deviation of the septum to the right below, to the left in the other naris, above.

Each growth was approximately 1 c.m. square, and the two met to close the naris.

A specimen of the growth was submitted to Drs. Brem, Zeiler and Hill for examination. The report stated that the growth had a stroma of connective tissue surrounded by a thin layer of squamous epithelium, the center being composed of myxomatous tissue. The epithelium was reported to be regular with no extension into the growth, thus giving no evidence of malignancy.

The growths were removed with the knife down to the bone and cartilage underlying them. The patient was then referred to Dr. Soiland for x-ray treatment (because the pathologists had reported active mitotic changes as going on in the nuclei of the growth) under which perfect healing took place in a short time.

There was no recurrence, but a very small extension anteriorly was discovered later and removed. This was not located on the area operated previously.

In December, 1915, the nose was free from all growth, and this month—July, 1916—conditions are equally favorable.

At the present time I should advise treatment by radium rather than by the x-ray.

Suite 1120 Brockman Building.

## SOCIETY PROCEEDINGS.

### NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

*December 20, 1917.*

DR. H. L. LYNNAH, *Chairman.*

#### **Spreading of the Upper Dental Arch to Increase Space in the Nasal Fossae. Third Presentation of the Case. DR. EDWARD A. BOGUE.**

The patient, a young man, first appeared before the Section on February 23, 1916. The right nasal meatus was entirely occluded and had been so for some time. The Glatzel mirror showed no trace of moisture from the breath. The screws of the spreader were started to work that same evening, after the patient had been examined by a number of the gentlemen present. At the following meeting of the Section, March 22, the two halves of the upper maxillary had been spread by the action of the screws, so that the ends of the cuspid teeth were eight and one-half millimeters further apart laterally than they had been at the date of the previous meeting. Two entire turns of the forward screw were made after the March meeting, gaining sixty one-hundredths of an inch each time. After that, the apparatus had remained stationary from that time to this. During the summer an elastic arch was adapted to the lower teeth, which have gradually been spread to the articulation which could be now seen and which was more nearly perfect than was often found among teeth that were called regular. At the present date the nasal passages were both ample and had remained so since the last summer, except for a few days, when a slight thickening, due to cold had been noticed. The teeth generally looked better than before they began their operation. Mastication was far better than it had ever been before and health had improved continuously. This much had been accomplished within the year.

*Case 2.* The patient, a young man, was twenty-five years of age and had what would be called an unusually good occlusion of the upper and lower teeth. He was sent to Dr. Bogue by his physician, because of difficulty in breathing through the left nostril. Adenoid and tonsils had been removed at four years of age. Adenoid was again removed at eighteen years of age. A turbinate operation was made in 1909, since which time color and weight had both been lost. The most noticeable defects in the dental arches were that they were rather narrow at the bicuspid region and the cuspids and lateral incisors, both above and below, were twisted, showing that when they erupted there was not room in the arch for them to come in, in perfectly regular positions. In the hope of improving his nasal breathing, the rapid spreading appliance was adapted to his teeth. The upper arch at the second bicuspid region was thirty-one and



one-half millimeters broad when the patient first came in. On August 4th they began to apply pressure to spread these arches. On October 11th they had spread the upper arch to thirty-six millimeters in breadth and the lower arch of teeth was gradually coming into nearly correct occlusion, as exemplified in the model of December 6th.

Regulating appliances were now being applied to exert torsion on the lateral incisors and cuspids, which were irregular at first, to bring them into proper alignment in the broadened arches. This was orthodontia, in contradistinction to the operation for rapid spreading, which was done for the sake of its influence upon the nasal passages.

#### DISCUSSION.

DR. THEODORE W. CORWIN said he had the pleasure of referring the case to Dr. Bogue and he wished to substantiate the statements made in regard to it. He was unable to keep personally in touch with the patient, because of illness, but he could with great confidence, tell those present that there had been a very great increase in respiratory ability, which in the nose had now become quite free. The patient had a deflected septum on the right side, which had diminished very materially. The case of the young man was somewhat peculiar and interesting, because his father had the same trouble of narrow dental arch and very high palate; he was a confirmed mouth-breather and his face showed the same deformity.

Dr. Corwin hoped that the formation in the case would become permanent. The patient's mental faculties were very active, however, but he had had all sorts of nervous tendencies. His general health was now very much improved. He had had no pain during this treatment. It was very interesting from the dental standpoint, because there had always been great fear expressed that any separation of the jaws had to be met by surgical operation of severity, liable to produce pain and shock. It seemed in this case that expansion of the aperture had relieved the nervous tendency and irritability.

DR. FRANCIS J. QUINLAN asked whether in the case of Dr. Bogue there had been a removal of both turbinals. He said the condition had been very much improved by this treatment, but not altogether, and the splendid work of the doctor's would have to be further supplemented because there was still obstruction in both nostrils posteriorly. The patient had two large posterior hypertrophies, which the extensive treatment had not altogether overcome and later on the obstruction would return if these hypertrophic masses by suction kept up a rarefaction of air in the nasal chamber.

DR. WILLIAM H. HASKIN said he had read a paper on this work in 1911, and that Dr. Bogue is to be congratulated on these cases. The patient mentioned by Dr. Quinlan had been operated upon but the result was not one to be proud of, and if the case were going to get relief he would have to have still wider expansion or undergo another operation on the septum. Dr. Haskin said that Dr. Bogue had treated two members in his own family by rapid spreading of the superior maxillae and both had improved. His own boy, fifteen years old, now weighed one hundred and thirty-five pounds and since the work was done six years ago he practically had never had any colds or serious illness. To get nasal relief, rapid spreading should be done, even more rapidly than done by Dr.

Bogue. The jaws should be spread in three or four weeks, if there was to be actual nasal relief. In young children the septum actually forces itself down into the separation between the superior maxillary bones and tends to fill the space. The case referred to by Dr. Corwin illustrated what happened when one took a large piece of cartilage out of the nose. Regardless of improvement of the teeth, which was a long, slow process, nasal relief should be obtained within three to four weeks. If the patient then wanted to go on with the treatment and have the teeth regulated, that was another question. The actual benefit from expansion should be obtained in a very short time.

Dr. Lewis A. Coffin said he had looked at this patient's jaw and wished to congratulate Dr. Bogue on the results as shown by casts taken before and after. Dr. Coffin said he had also examined the patient's nose and while he could not say how much breathing-space he had previous to the spreading of the jaw, he found the breathing space on the right side very much encroached upon by a large exostosis accompanying the nasal deviation. Perhaps it was the thickening which had prevented this particular septum from "dropping into the space caused by the spreading." The spreading of the jaw must add materially to the better looks of the boy and when his teeth have been regulated he should seek out a good rhinologist who will do a submucous resection of his septum when he will become not only a better looker but a good breather.

Dr. WILLIAM H. HASKIN said no angular deviation of the septum would disappear by spreading the jaws. This boy was taken too late. If it had been done when he was five or six years old the septum would probably have developed normally and the displacement of the premaxillary wings would have been avoided.

The benefit derived in both of the cases presented undoubtedly was due to the increase of the width of the anterior nares.

Dr. EDWARD A. BOGUE said he felt thankful to the gentlemen who had been kind enough to speak of these cases and that Dr. Haskin ought to transfer the age at which the best results are to be obtained, back to about five and one-half to six years. One of the cases presented this evening was Dr. Corwin's and the other was also from Jersey, who came to Dr. Bogue after all these operations by various rhinologists. He was experimenting to know whether in that case he could succeed in obtaining permanently improved nasal passages. In Dr. Corwin's case his hopes had been fully gratified. He thought Dr. Black, of Milwaukee, was correct, and Dr. Haskin seemed to confirm his view that when the bones of the upper maxillary are spread apart sufficiently in a young patient, the resiliency of the cartilaginous part of the nose was sufficient to drive down a goodly portion of the cartilaginous septum between those separated bones. He did not dare to speak about the bony part. Dr. Corwin's patient had a spur on the right side; he doubted very much whether that was going to be improved by his spreading operation.

He wanted to speak of another subject. He had some eighteen hundred plaster models of mouths. Among them all he did not know a single one that had grown in a lateral direction that, at the age of four, five or six years of age, did not have a width of the upper arch greater than twenty-eight millimeters. A certain surgeon brought him his little boy, who came with his mother, a gray-haire lady. Dr. Bogue persuaded her to sit

down while he measured her upper maxillary arch, which he found to be twenty-six and one-half millimeters in breadth. It had never grown in width since she was four and one-half years old, and he had found no case in which lateral growth had ever taken place unaided unless the width of the temporary dental arch exceeded 28 millimeters. He found he could spread these cases in little children and obtain astonishing results. He had one little patient of six years, who was deaf and had to be talked to in quite a loud voice, who inside of four months could hear a low voice. The Eustachian tube seemed now entirely cleared and also the nasal passages. If they commenced to correct mouth-breathing before it had become confirmed they would get a much better success than could be obtained later on.

**A Case of Tic Douloureux Treated by the Avulsion Method of La. Place.**

DR. H. HOLBROOK CURTIS.

*(To be published in a subsequent issue of THE LARYNGSCOPE.)*

DISCUSSION.

DR. FAULKNER said the result in this case was an excellent one that the avulsion method was undoubtedly a recognized procedure. In these cases the three procedures were alcohol injection, the avulsion method, and gasserectomy. As far as therapy and surgery went, he thought that alcohol injection, when successful, was just as successful as any other method. Success was merely a question of technique of the operator. The last Tuesday evening he had reported twenty-one cases before the neurological section, treated by alcohol injection. Twelve had been successful and nine cases unsuccessful. In each one of the nine unsuccessful cases he did not get the nerve. His experience had lasted over three years and he had not had a single recurrence in a case where he was certain he had got within the nerve sheath. A good many of these cases came to him after they had already received alcohol injections. The cases at first were a little discouraging but with improved technique, results were better.

Dr. Faulkner said the technique was to inject alcohol into the sheath of the nerve. In putting in the needle the landmarks were not always followed, but if they knew the anatomy on cadaver they would determine the route by the sense of touch on the point of the needle. A one per cent cocaine solution was put in the skin and the needle then pressed in the direction of the nerve. The patient would tell the operator if he got the nerve. If so, inject a few drops of cocaine in the nerve. About three minims of a one per cent solution of cocaine was usually injected. And if in the nerve, anesthesia occurs in a few seconds. In some cases the nerve could be gotten at the first attempt, but not very often. In one patient he had been unsuccessful three times, but at the fourth time he got the nerve. The second division seemed to be the one most commonly affected.

Dr. Faulkner thought that with a more perfect knowledge of anatomy and experience on the cadaver it would be possible to get nine out of ten successful cases. He said this method **should go** before the operative, but if one could not get the nerve, the operation which Dr. Curtis described was a justifiable procedure.

DR. MACKENTY said that the Section was indebted to Dr. Curtis for his very able description of the operation.

In regard to Dr. Faulkner's results, he could speak with conviction, as he had observed the work and the results. He considered the work of nerve injection a one-man job. Few had the anatomical knowledge possessed by Dr. Faulkner or had spent the time to acquire the technique. The poor work done by many was due to lack of the qualities possessed by Dr. Faulkner. Personally, he would not attempt it, knowing how difficult it is to one doing it only occasionally.

Dr. WILSON asked whether he understood the doctor to say that such cases had not returned in a number of years. It had been his experience that most of these cases returned after injection in a year or year and a half. The cases that returned earliest were cases with arterio-sclerosis, which had been his observation. He believed, however, that this operation had a place because there were times when they could not make a diagnosis of what was causing the tic douloureux. In regard to the remark that they should go to the root of this thing, Dr. Wilson said the root could not always be found.

Dr. H. HOLBROOK CURTIS said he had looked up the literature on the subject, extending at least over fifty years and the best article written was by an old-fashioned physician, who stated that no focal lesion could be discovered. This patient had no focal lesion so far as the speaker could see.

Dr. WILLIAM H. HASKIN said that he had never seen a case in which he could not find the cause for the pain, that he had never seen a true case of tic douloureux. He had several specimens of bones where the floor of the sphenoid sinus was a mass of osteomas. These undoubtedly caused pressure on the nerve, which must have caused pain during the patient's lifetime. He had seen the same condition in the antrum of highmore, the exostoses growing on the lateral walls of the sinus. He had two specimens with distinct exostoses over the canal of the nerve as it ran along the outer wall of the antrum of Highmore. It was almost impossible to find these exostoses in a living patient, but they do exist and in cadavers can be found in a large number of specimens. He believed that there was a distinct disease of tic douloureux, but that it was a very rare disease; and he did not think that avulsion of the first, second, or third branch of the nerve would actually cure the trouble. The only cases he had heard of that had been cured were treated by the removal of the superior cervical ganglion of the sympathetic. Dr. Fermier in Lyons, France, had reported a great deal of work on this neurological condition. His cases had been treated with alcohol injections and avulsions, and even resections of the Gasserian ganglion, and had finally been relieved by resection of the superior cervical ganglion of the sympathetic. It was not an operation to be desired if it could be avoided, because of its atrophic effect upon the face, eyes, and various other tissues.

**Laryngectomy and Resection of the Upper End of the Esophagus. Dr. JOHN E. MACKENTY.**

The patient presented is a male adult, age 46. Cancer of the larynx and esophagus. The growth involved the posterior part of the larynx on both sides, extending about three-quarters of the way around the mouth of the esophagus. The larynx was removed with the esophagus as far down as the opening into the thorax. The operation was done on July 16.

So far there has been no recurrence, but this would undoubtedly occur. It seemed better to remove the esophagus than to do a gastrectomy, which would surely have been required in a short time. The man's condition was good and he had gained weight since the operation.

In esophageal cancer, pains in the region of the ears and over the top of the head are generally present. In this case they were so severe as to require morphine. Since the operation this symptom has not been complained of.

**Vincent's Angina.** DR. JOSEPH H. ABRAHAM.

The patient was a young man who had no family history of syphilis or any malignant growth, but gives the following history. He had the usual diseases of childhood. At the age of seven he had scarlet fever, at ten an attack of inflammatory rheumatism lasting three days, at twelve another attack and at the age of fourteen years an attack lasting four months. He also had nervous prostration at sixteen. On September 25, 1914, he had an attack of tonsillitis, lasting two weeks, followed by quinsy and sore throat lasting three weeks. Then an attack of rheumatism lasting one week and another lasting two weeks. On December 28, the patient had sore throat and developed a diphtheritic ulcer on January 8. The throat cleared up by January 29 and he recovered very slowly. In September, 1915, he had his tonsils removed, and in January, 1916, an attack of pneumonia lasting three weeks. In July, 1916, the patient noticed three canker sores. He consulted Dr. Smith, of Jeanett, Pa., who treated him with silver nitrate sticks and the throat cleared up in five days.

On September 4, 1916, the patient noticed three small canker sores, one on both sides of the tongue and one on left cheek; he used a gargle and the sores did not respond to this treatment. On September 8, the patient consulted Dr. Mulholland, who treated him for several days. He had very little pain at this time and no swelling, only slight difficulty in swallowing. The sores on the right side of the cheek and tongue disappeared under the doctor's treatment, but at the end of twelve days the sore on the left side of the tongue began to increase in size. The patient was unable to sleep at night. He was referred to Dr. Stammers, who examined the patient and gave a mouth wash. On September 21, he was referred to Dr. Grausman. The patient first noticed a foul-smelling discharge from the sore about September 20. About September 22, Dr. Grausman asked Dr. Abraham to see the case and on looking at the patient the speaker was suspicious immediately of Vincent's angina. They thought it was a case of actinomycosis and Dr. Kalisky pronounced it so at the laboratory of Mount Sinai Hospital, but also stated he found the fusiform and spirillae. Dr. Abraham did not agree with that diagnosis and had some slides sent to Dr. Jeffries, who examined them and reported the pure culture of fusiform and spirillae. The speaker began treatment on the patient, treating him as an outdoor case, but he seemed to get along so poorly, the suffering was intense and there was a rise in temperature. He was put in the Polyclinic Hospital on September 25. The patient then had a large ulcer on the left side of the tongue, about one and one-quarter inches in circumference. A considerable portion was eaten away and the ulcer extended below the tongue and down the neck. There was a foul

smelling discharge when he passed a cotton-tipped applicator down into the neck. The glands were swollen up enormously on the left side. The patient could hardly open his mouth, the ulcer also involved the remains of the left tonsil and anterior faucial pillar, then to the periosteum covering the lower jaw to the extent of the last two molar teeth, on the inner surface and exposed the bone from the last molar along the anterior border the ramus; passing the inferior maxillae it skipped to the upper jaw, denuding it of the periosteum posterior and above the last molar. The temperature was 103 degrees.

When Dr. Abrahams first saw the case he noted the peculiar odor. He said that one familiar with it could hardly mistake it from the odor of necrosis, syphilis or any other disease. Smears were taken during treatment and after the first treatment in the hospital, the number of bacteria seemed to decrease markedly after each treatment. They had it under control in about four or five days and kept the patient in the hospital until October 10th, before he was allowed to leave healed. The patient was fed with a tube every three hours through the nose and allowed no food by mouth.

The treatment consisted in the application of pure carbolic acid used on a cotton-tipped applicator. When dealing with marked necrosis it was imperative that the necrotic area be removed with curved scissors so the acid could penetrate, prying the mouth open with some form of opener, while the nurse holds it. The necrotic periosteum was hanging in shreds. The applicator was pressed into the ulcerated area until the carbolic acid ran over the surface, which was allowed to remain there for one minute and then was neutralized with alcohol. It had been impossible to make all the applications at once as he had to let the patient wash out the saliva. He protected the whole side of the face with vaseline. After the first application there was slight pain, but after that there was anesthesia, the applications being made without cocaine. He sent the patient down to Dr. Hasbrook, who removed the last molar tooth, which was entirely denuded of the periosteum and asked him if the bone there was free to also take it out. A sequestrum was removed, which Dr. Abraham presented to the section.

#### DISCUSSION.

DR. HUBERT ARROWSMITH said he did not see exactly why Dr. Abraham used such an agent as carbolic acid. The result was excellent, but he had never seen a case which did not respond quickly to the local application of salvarsan—a five per cent solution in glycerine. It is rapidly efficacious in every instance, and is much less disagreeable and painful to the patient. In earlier days these cases had been treated with very indifferent success by the tri-chlor-acetic acid, methylene blue, nitrate of silver and other agents. When we have in salvarsan a certain and not unpleasant specific, why search further?

DR. FRANCIS J. QUINLAN said it seemed to him that there was always some allied condition in Vincent's angina and syphilis like lupus and tuberculosis. He did not know about discussing this relation, but as Dr. Arrowsmith had said, salvarsan cleared these cases up. In regard to putting this man through the torture he underwent, it seemed to the speaker, in the present light of progressive medicine, that we ought to



anticipate such heroic measures. Carbolic acid was a severe measure, with its sloughing, and the cicatrices which were found in this patient. It seemed to him in a case of this severity, with such ulceration and sloughing, that something more than a local agent would be justifiable, although salvarsan locally seemed to clear up these conditions.

DR. JOSEPH H. ABRAHAM said he was familiar with the salvarsan treatment for several years but had not used it because it was so expensive and everyone had carbolic acid, and furthermore, carbolic acid has proved a specific in his hands. In many cases two applications, one a. m. and one p. m., were sufficient. They must find the fusiform bacillus and spirillae in these cases. In the cases treated there had been slight pain for the first second, but after that anesthesia. In cases localized over the tonsil alone he referred his cases to the pathologist first for examination. If Vincent's was present, the acid treatment was applied immediately. He cleaned out the tonsils, using two applications every twenty-four hours. After every application in the morning he sent the patient back to the pathologist and if he did not find any more fusiform bacilli, the speaker considered the case cured. He did not doubt that salvarsan cured these cases, but if they were cured by a simple remedy, as carbolic, in so short a time, he was in favor of it because every physician had carbolic acid, and in his hands it has proven a specific.

DR. MACKENTY said that salvarsan gave such good results that the application of pure carbolic acid as outlined by Dr. Abraham did not seem justifiable. He felt that the contraction observed in this case might be due to the treatment.

DR. JOSEPH H. ABRAHAM said that he was surprised at the criticisms of Dr. MacKenty, especially after so full a report of the history had been given, and that it had been distinctly stated that the patient was under the care of various physicians, all of whom had made various applications to the ulcerated area. When he saw the patient, the periosteum was denuded on the inner surface of the lower jaw in the region extending from the last two molar teeth backward and upward along the anterior border of the ramus of the lower jaw, exposing the bone. Also, the periosteum covering the last molar of the upper jaw was necrosed and bone was exposed. With such an extensive ulcer of the periosteum covering so large an area, the patient was bound to have a slight stenosis. In the healing process following such an extensive necrotic area, scar tissue was bound to follow, and the slight stenosis that is present is due to the large amount of cicatricial tissue. This was bound to follow if the acid had not been applied. Therefore, he could not agree with the Doctor that the acid was the cause of the stenosis, but rather that the pathological changes and Nature's method of healing was the direct cause.



